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(54) **METHODS AND APPARATUS TO PERFORM CONSUMER SURVEYS**

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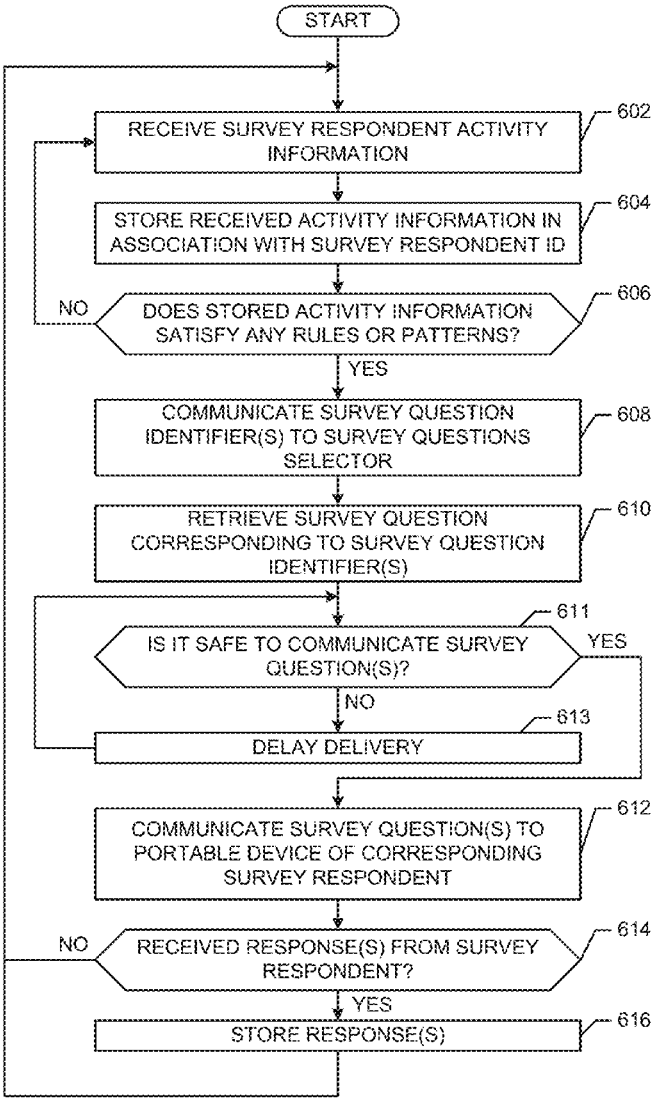
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(57) **ABSTRACT**

Methods and apparatus to conduct surveys are disclosed. An example apparatus includes processor circuitry to determine a number of exposures to at least one of an advertisement or a product based on feedback from at least one of a microphone or a radio frequency (RF) sensor of a portable device. The processor circuitry further to retrieve a survey question based on the number of exposures satisfying a rule; identify a recall time when the survey question is to be presented, the recall time corresponding to a duration after satisfaction of the rule; and offer, at the recall time, the survey question related to the at least one of the advertisement or the product via the portable device.



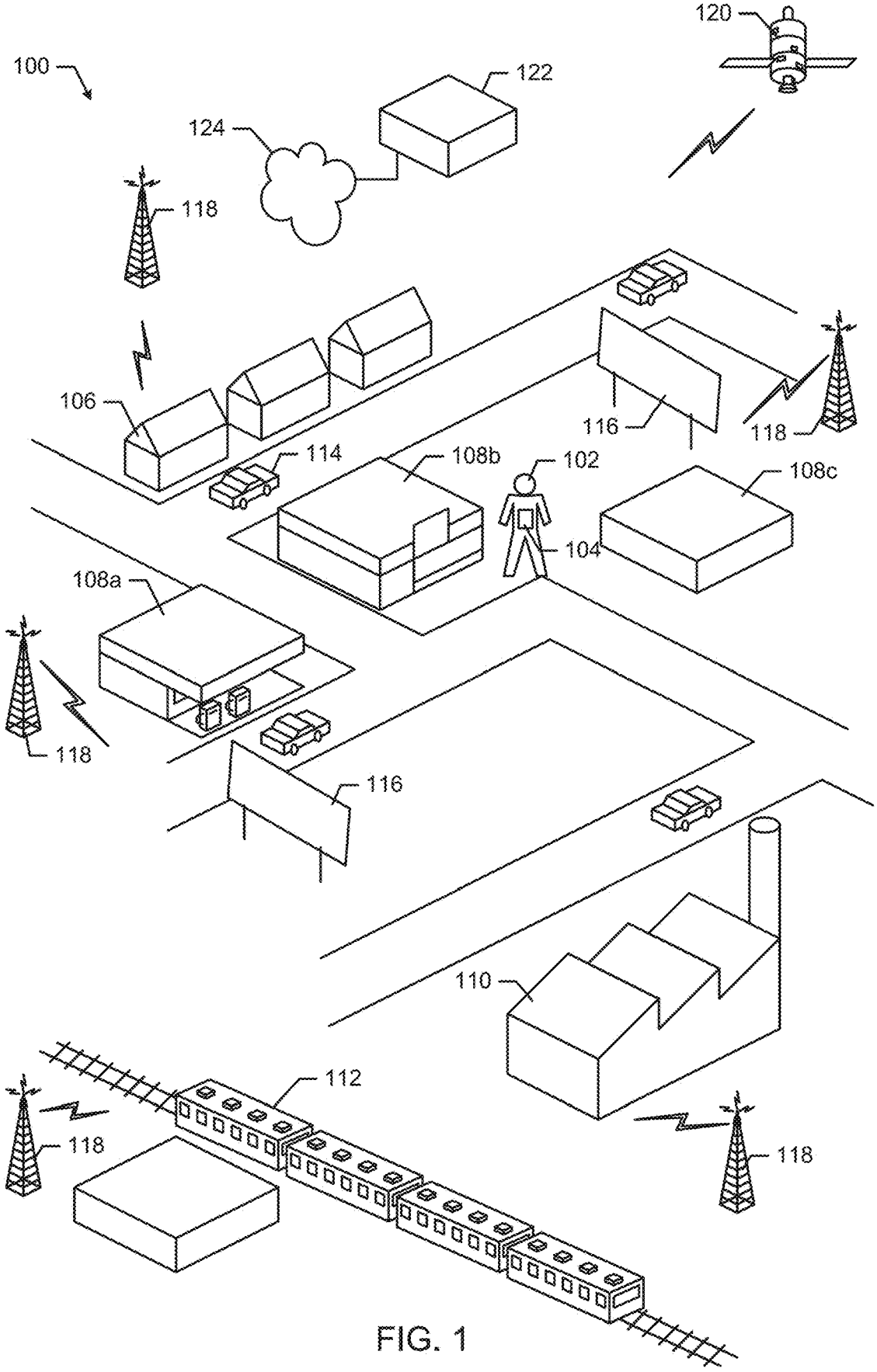

100
120
122
124
118
106
116
118
114
108b
102
108c
104
108a
118
116
110
112
118
118

FIG. 1

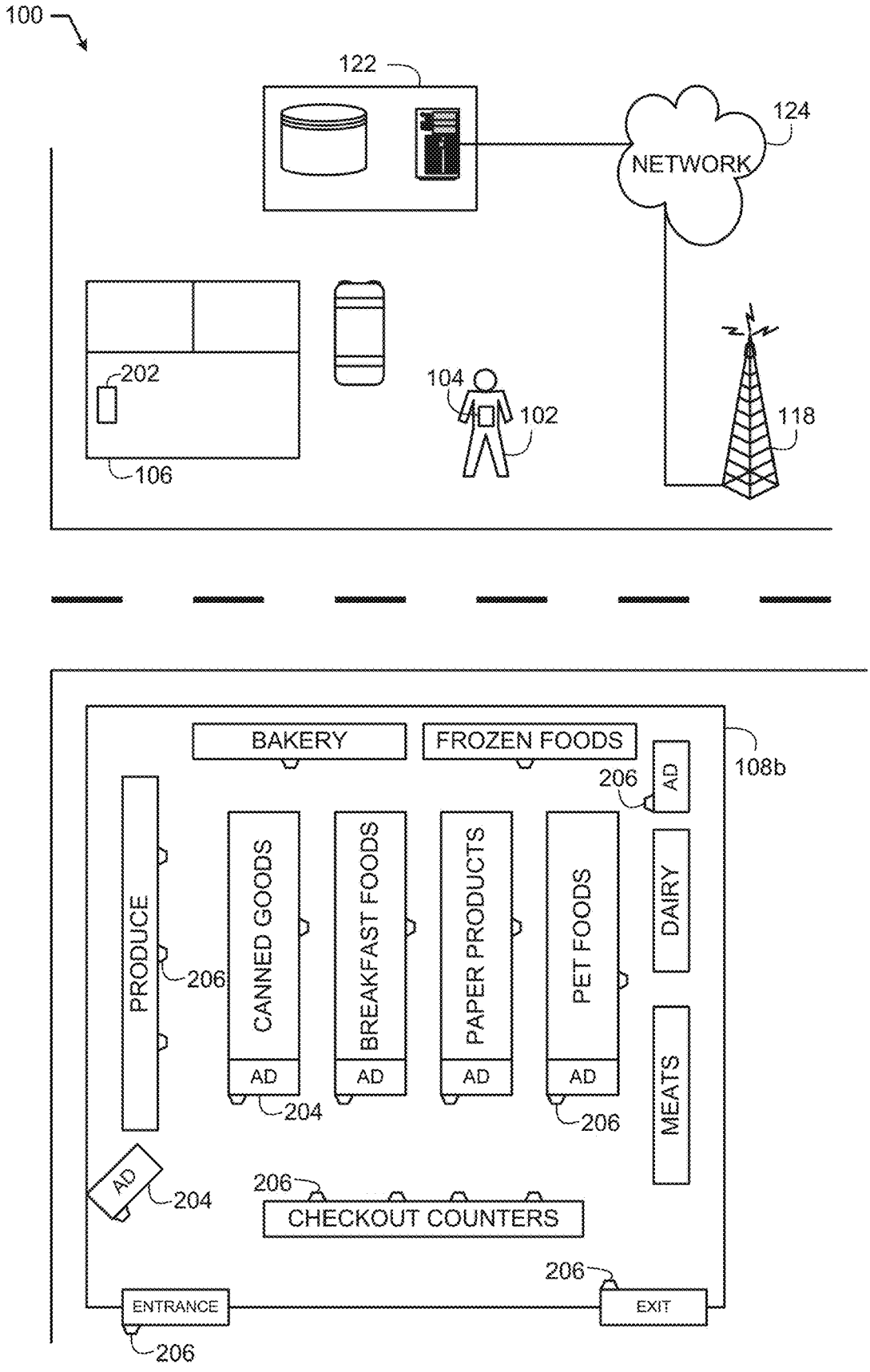

100
122
124
NETWORK
202
104
102
118
106
BAKERY
FROZEN FOODS
108b
206
AD
PRODUCE
CANNED GOODS
BREAKFAST FOODS
PAPER PRODUCTS
PET FOODS
DAIRY
MEATS
204
CHECKOUT COUNTERS
ENTRANCE
EXIT

FIG. 2

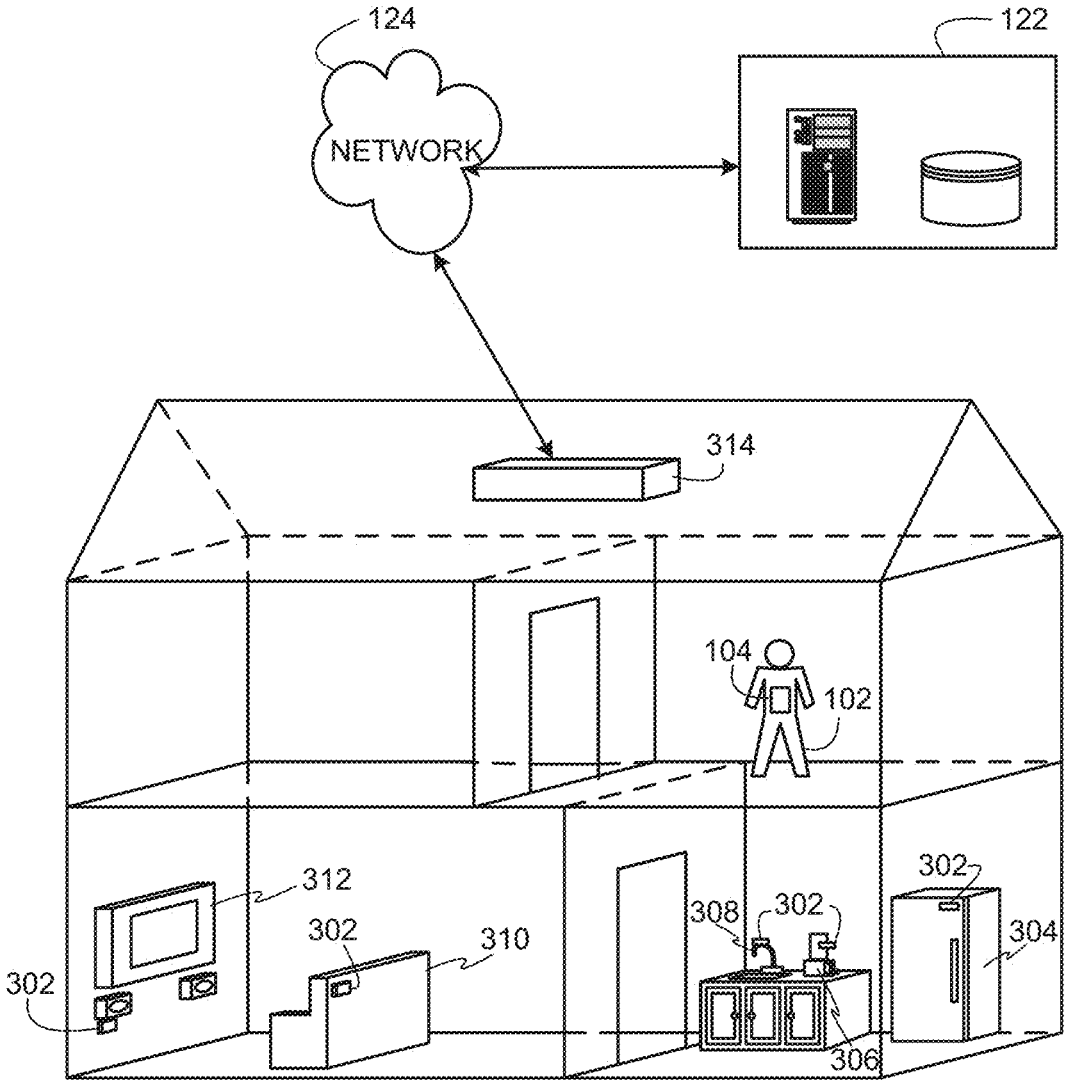


FIG. 3

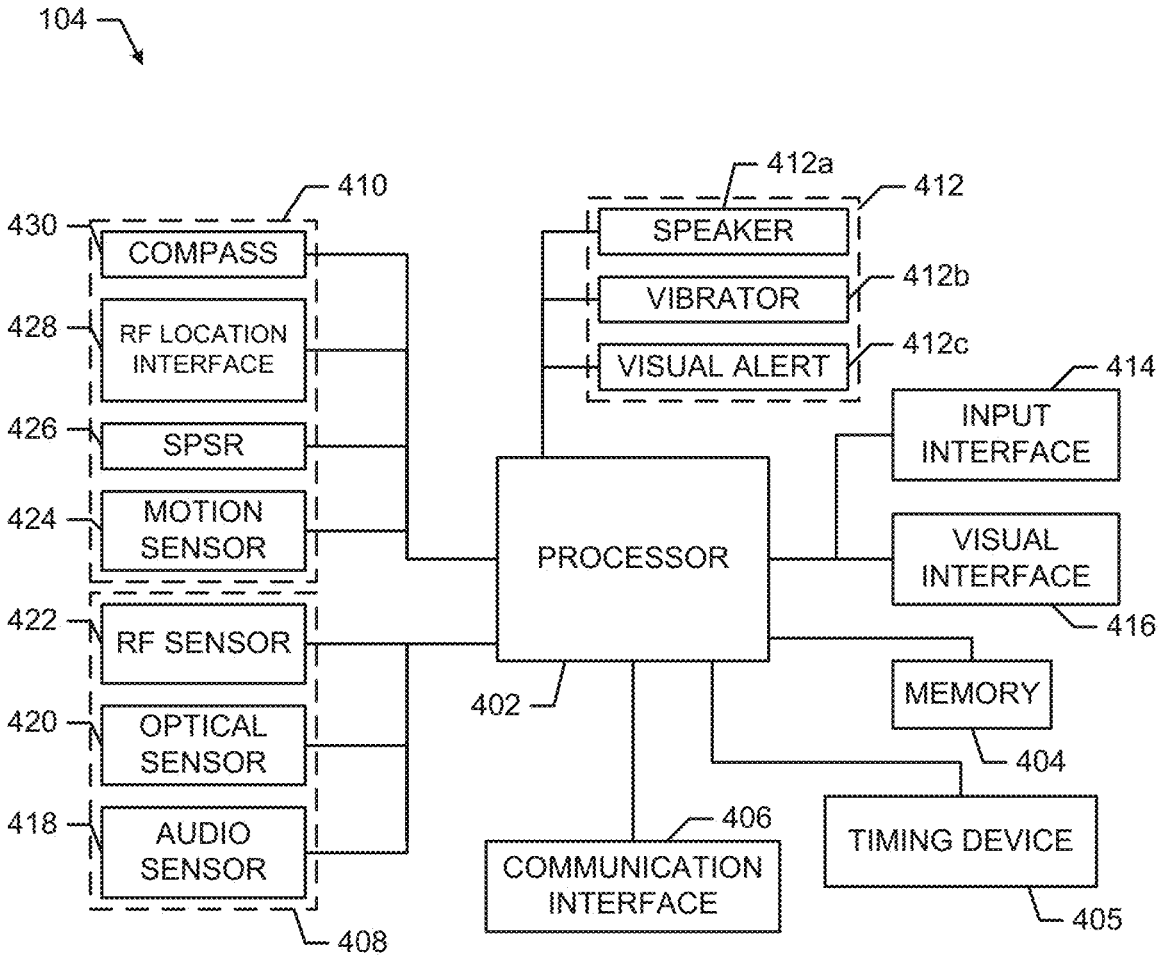

104
410
430
COMPASS
428
RF LOCATION INTERFACE
426
SPSR
424
MOTION SENSOR
422
RF SENSOR
420
OPTICAL SENSOR
418
AUDIO SENSOR
408
412a
412
SPEAKER
412b
VIBRATOR
412c
VISUAL ALERT
414
INPUT INTERFACE
PROCESSOR
VISUAL INTERFACE
416
402
MEMORY
404
406
COMMUNICATION INTERFACE
TIMING DEVICE
405

FIG. 4

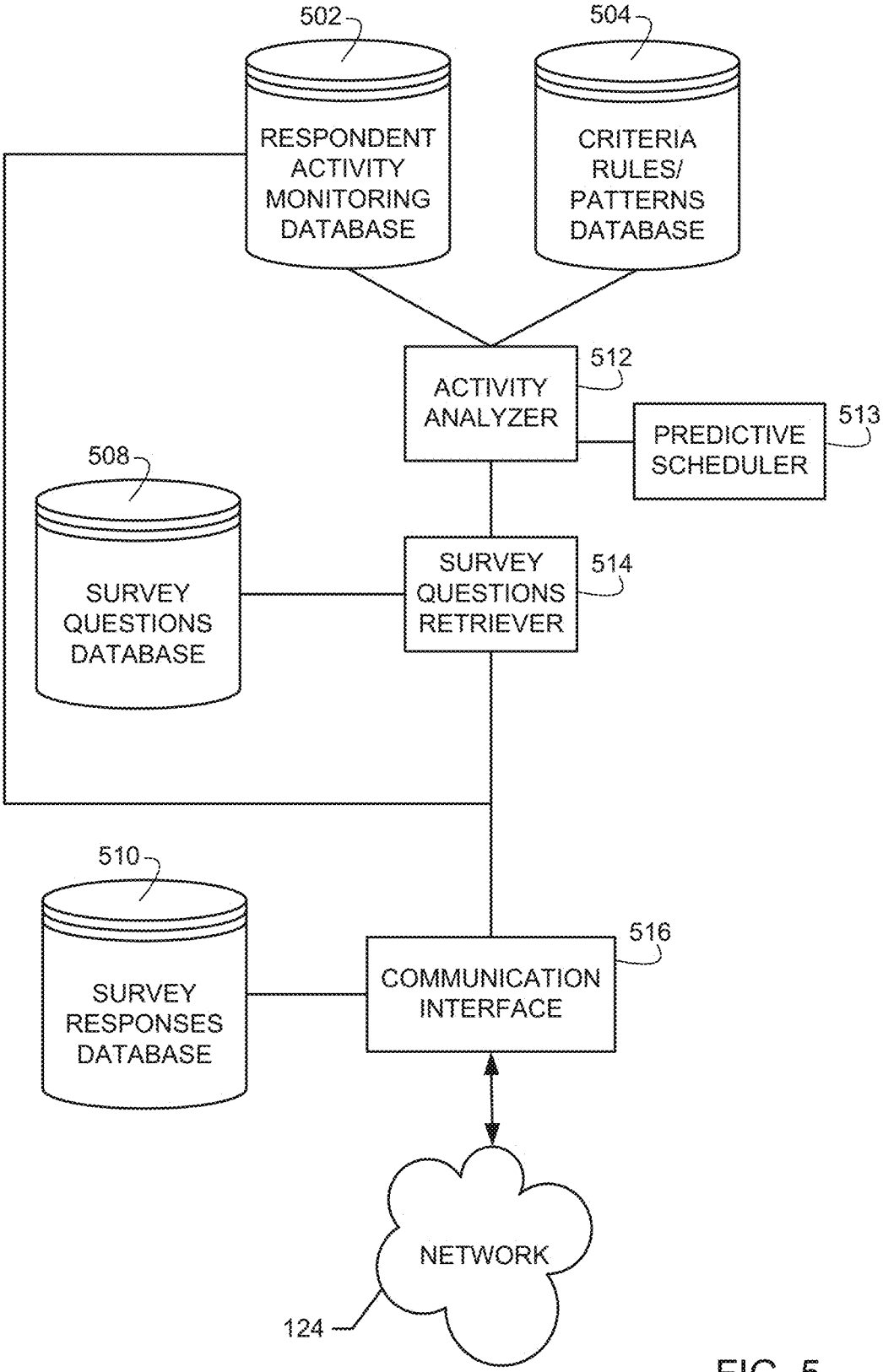

502
RESPONDENT ACTIVITY MONITORING DATABASE
504
CRITERIA RULES/ PATTERNS DATABASE
512
ACTIVITY ANALYZER
513
PREDICTIVE SCHEDULER
508
SURVEY QUESTIONS DATABASE
514
SURVEY QUESTIONS RETRIEVER
510
SURVEY RESPONSES DATABASE
516
COMMUNICATION INTERFACE
NETWORK
124

FIG. 5

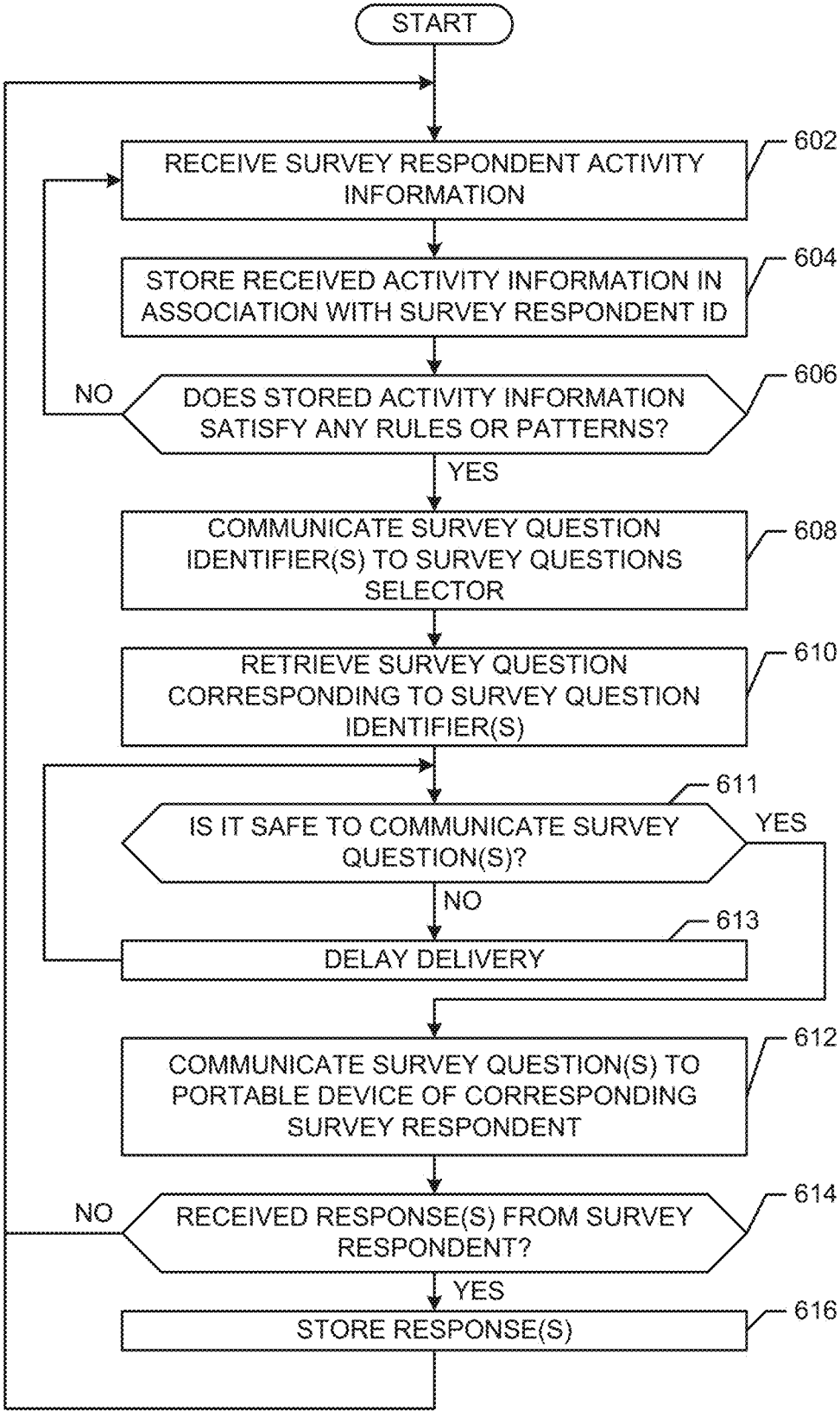

START
RECEIVE SURVEY RESPONDENT ACTIVITY INFORMATION
602
STORE RECEIVED ACTIVITY INFORMATION IN ASSOCIATION WITH SURVEY RESPONDENT ID
604
DOES STORED ACTIVITY INFORMATION SATISFY ANY RULES OR PATTERNS?
606
NO
YES
COMMUNICATE SURVEY QUESTION IDENTIFIER(S) TO SURVEY QUESTIONS SELECTOR
608
RETRIEVE SURVEY QUESTION CORRESPONDING TO SURVEY QUESTION IDENTIFIER(S)
610
611
IS IT SAFE TO COMMUNICATE SURVEY QUESTION(S)?
YES
NO
613
DELAY DELIVERY
COMMUNICATE SURVEY QUESTION(S) TO PORTABLE DEVICE OF CORRESPONDING SURVEY RESPONDENT
612
RECEIVED RESPONSE(S) FROM SURVEY RESPONDENT?
614
NO
YES
STORE RESPONSE(S)
616

FIG. 6A

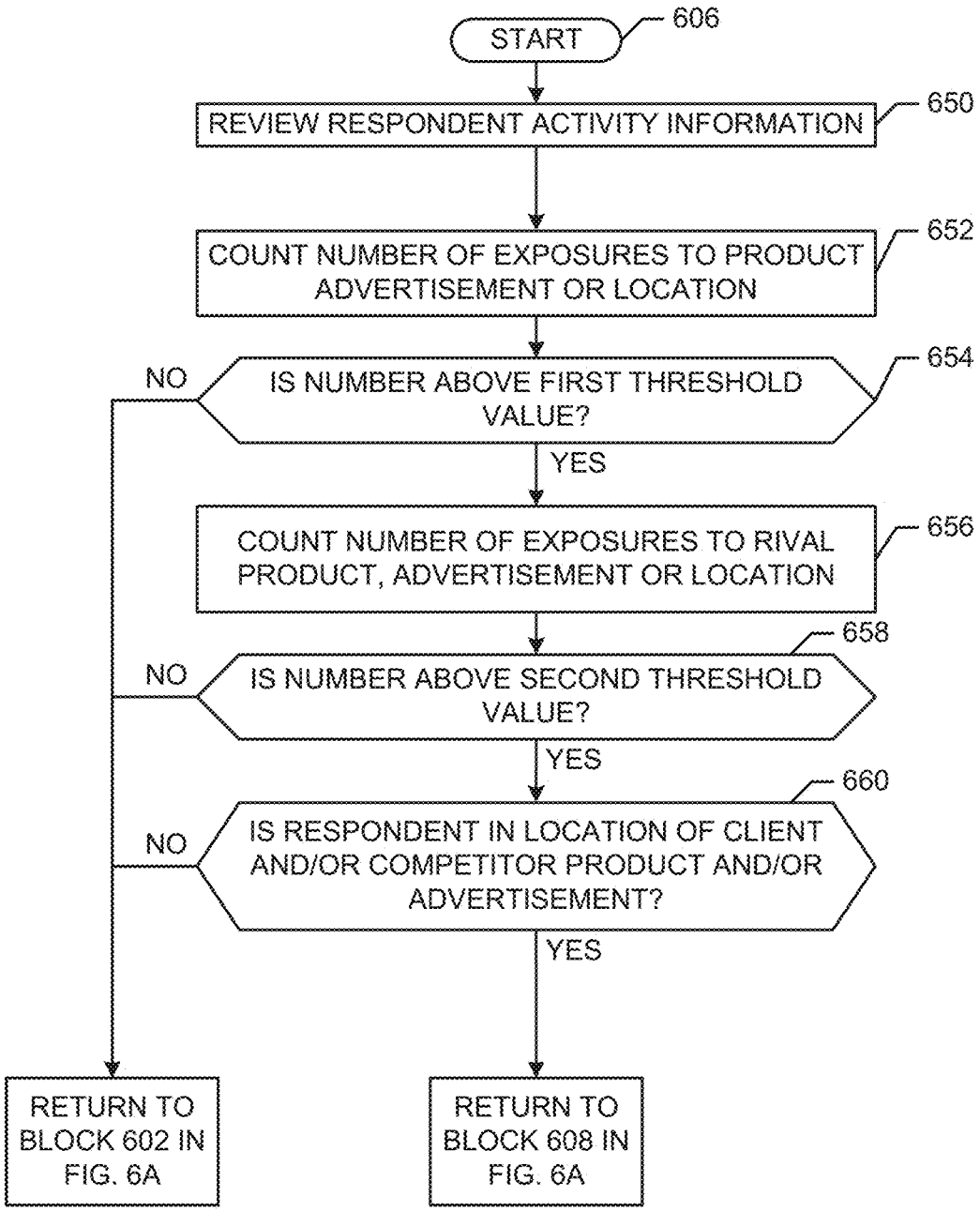

START
606
REVIEW RESPONDENT ACTIVITY INFORMATION
650
COUNT NUMBER OF EXPOSURES TO PRODUCT ADVERTISEMENT OR LOCATION
652
IS NUMBER ABOVE FIRST THRESHOLD VALUE?
654
NO
YES
COUNT NUMBER OF EXPOSURES TO RIVAL PRODUCT, ADVERTISEMENT OR LOCATION
656
IS NUMBER ABOVE SECOND THRESHOLD VALUE?
658
NO
YES
IS RESPONDENT IN LOCATION OF CLIENT AND/OR COMPETITOR PRODUCT AND/OR ADVERTISEMENT?
660
NO
YES
RETURN TO BLOCK 602 IN FIG. 6A
RETURN TO BLOCK 608 IN FIG. 6A

FIG. 6B

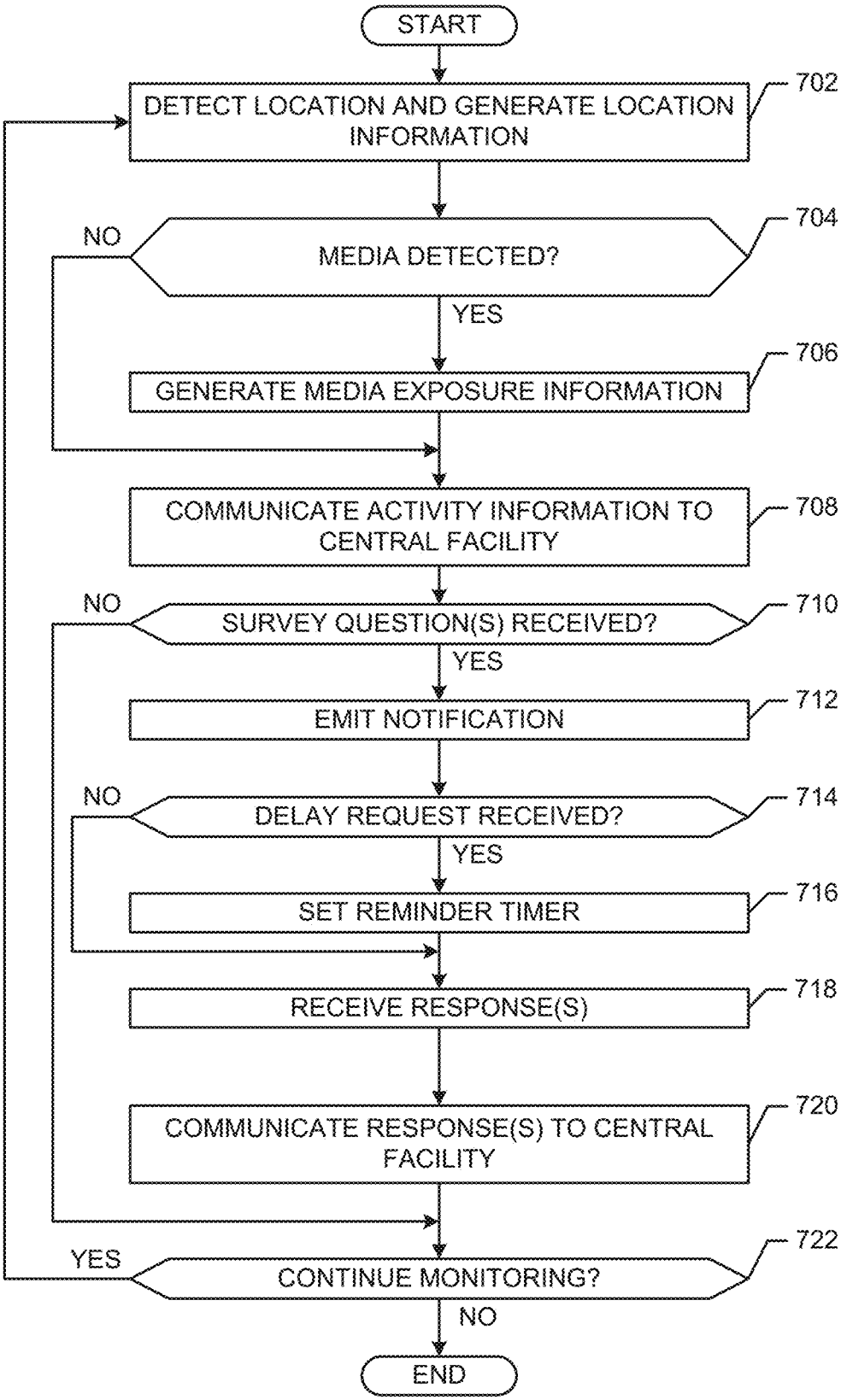

START
DETECT LOCATION AND GENERATE LOCATION INFORMATION
702
MEDIA DETECTED?
704
NO
YES
GENERATE MEDIA EXPOSURE INFORMATION
706
COMMUNICATE ACTIVITY INFORMATION TO CENTRAL FACILITY
708
SURVEY QUESTION(S) RECEIVED?
710
NO
YES
EMIT NOTIFICATION
712
DELAY REQUEST RECEIVED?
714
NO
YES
SET REMINDER TIMER
716
RECEIVE RESPONSE(S)
718
COMMUNICATE RESPONSE(S) TO CENTRAL FACILITY
720
CONTINUE MONITORING?
722
YES
NO
END

FIG. 7

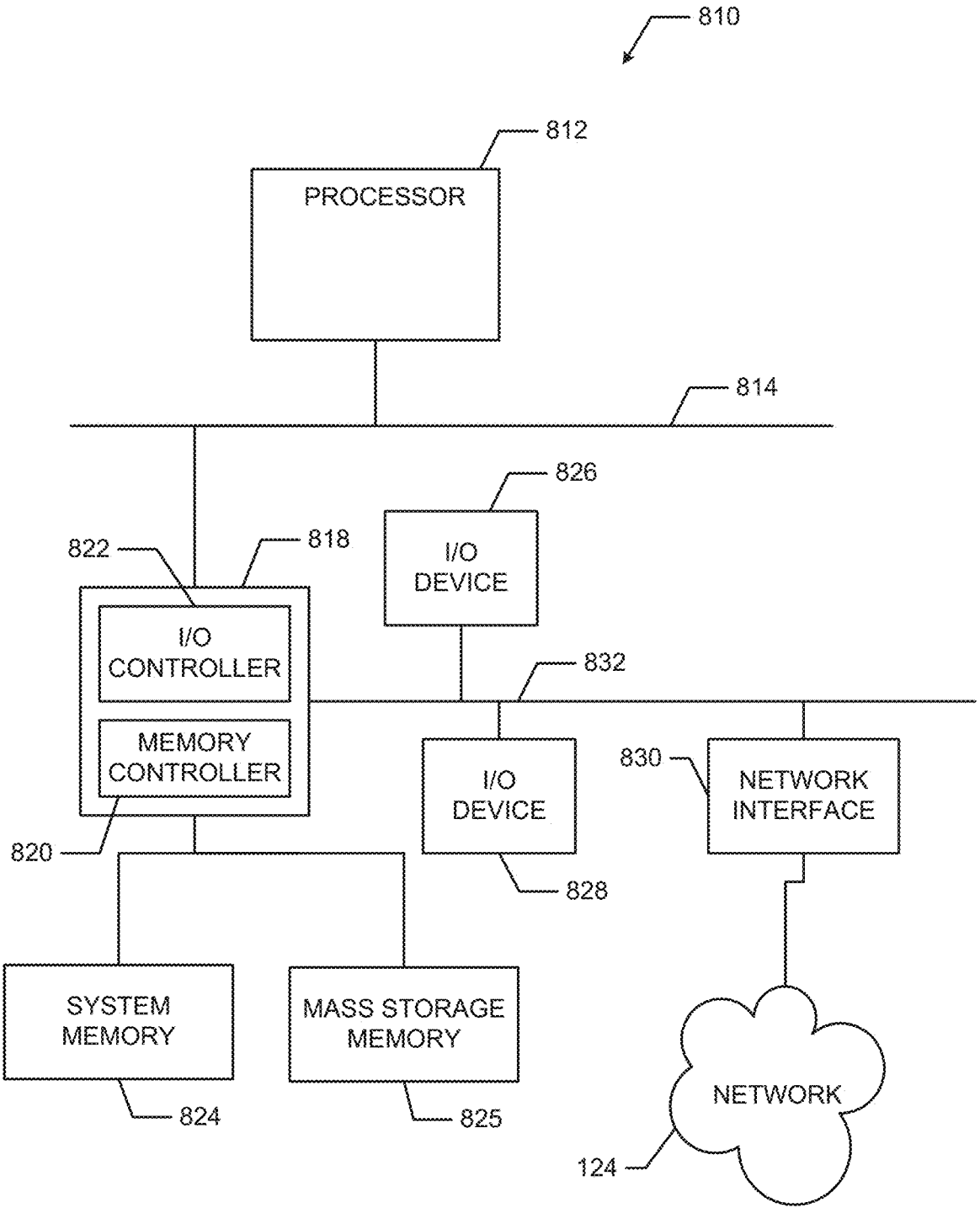

810
812
PROCESSOR
814
826
822
818
I/O DEVICE
I/O CONTROLLER
832
MEMORY CONTROLLER
I/O DEVICE
830
NETWORK INTERFACE
820
828
SYSTEM MEMORY
MASS STORAGE MEMORY
NETWORK
824
825
124

FIG. 8

<table>
<tr><th colspan="6">SMITH FAMILY ACTIVITY DASHBOARD</th></tr>
<tr><th>Time</th><th>Activity</th><th colspan="4">Person</th></tr>
<tr><td></td><td></td><td>Bob (Dad)</td><td>July (Mom)</td><td>Doug (Son)</td><td>Beth (Daughter)</td></tr>
<tr><td>6:00 AM</td><td></td><td rowspan="2">Pre-Work</td><td rowspan="2">Pre-Work</td><td rowspan="2">Pre-School</td><td rowspan="2">Pre-School</td></tr>
<tr><td>7:00 AM</td><td></td></tr>
<tr><td>8:00 AM</td><td></td><td rowspan="8">Work</td><td rowspan="8">Work</td><td rowspan="4">School</td><td rowspan="3">School</td></tr>
<tr><td>9:00 AM</td><td></td></tr>
<tr><td>10:00 AM</td><td></td></tr>
<tr><td>11:00 AM</td><td></td><td>Lunch</td></tr>
<tr><td>12:00 PM</td><td></td><td>Lunch</td><td rowspan="3">School</td></tr>
<tr><td>1:00 PM</td><td></td><td rowspan="2">School</td></tr>
<tr><td>2:00 PM</td><td></td></tr>
<tr><td>3:00 PM</td><td></td><td>Basketball</td><td>In Car</td></tr>
<tr><td>4:00 PM</td><td></td><td>In Car</td><td>TV</td></tr>
<tr><td>5:00 PM</td><td></td><td>Dinner</td><td>Dinner</td><td>Dinner</td></tr>
<tr><td>6:00 PM</td><td></td><td>Dinner</td><td rowspan="3">Free</td><td rowspan="2">Homework</td><td rowspan="2">Homework</td></tr>
<tr><td>7:00 PM</td><td></td><td rowspan="3">Free</td></tr>
<tr><td>8:00 PM</td><td></td><td>TV</td><td>TV</td></tr>
<tr><td>9:00 PM</td><td></td><td rowspan="2">Bed</td><td rowspan="2">Bed</td></tr>
<tr><td>10:00 PM</td><td></td><td>Bed</td><td>Bed</td></tr>
</table>

FIG. 9

METHODS AND APPARATUS TO PERFORM CONSUMER SURVEYS

RELATED APPLICATIONS

[0001] This patent arises from a continuation of U.S. patent application Ser. No. 15/990,187 (now U.S. Pat. No. 11,227,291), filed on May 25, 2018, which is a continuation of U.S. patent application Ser. No. 12/263,079, filed on Oct. 31, 2008, and claims the benefit of U.S. Provisional Patent Application No. 60/985,017, filed on Nov. 2, 2007. U.S. patent application Ser. No. 15/990,187, U.S. patent application Ser. No. 12/263,079, and U.S. Provisional Patent Application No. 60/985,017 are incorporated herein by reference in their entireties. Priority to U.S. patent application Ser. No. 15/990,187, U.S. patent application Ser. No. 12/263,079, and U.S. Provisional Patent Application No. 60/985,017 is claimed.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates generally to monitoring consumer behavior and, more particularly, to methods and apparatus to perform consumer surveys.

BACKGROUND

[0003] Surveys are often used to gather observer reactions and/or opinions about products, services, or media content (e.g., entertainment media, advertisements, etc.). Traditionally, such surveys include a set of questions that are presented to people at surveying stations or by surveying agents located in public places. The survey questions are preselected, and the same questions are presented to every person. Presenting standard survey questions in this manner may adversely affect the value of responses. For example, if the survey is about a particular product or a particular advertisement, the person being surveyed may never have been exposed to that particular advertisement or may not be a user of that particular product.

[0004] In addition, many traditional surveying techniques require that people responding to survey questions rely on their recall of the subjects (e.g., products, advertisements, etc.) being surveyed since such surveys may be conducted well after (e.g., hours or days) the people were exposed to the surveyed subjects. However, numerous factors may cause a respondent's recall to be inaccurate including, for example, the time lapsed since the respondent's last exposure to the surveyed subject or the respondent's familiarity (or lack thereof) with the surveyed subject. Thus, due to the dependence on a respondent's recall or familiarity, responses to traditional survey questions are likely to inaccurately reflect the respondent's attitude or the attitude of a target market about the surveyed subject. Further, survey questions presented after a significant delay since a respondent's last exposure to the surveyed subject often cause the respondent to ponder the subject being surveyed and attempt to recall her or his initial reaction, thereby causing the respondent to provide a less emotional reaction than that which was actually experienced at the time that the respondent was exposed to or was using the surveyed subject.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** illustrates an example geographic area in which the example methods and apparatus described herein can be implemented to perform consumer surveys.

[0006] FIG. **2** is a plan view of a portion of the example geographic area of FIG. **1**.

[0007] FIG. **3** is an interior view of a home in which activity sensors can be placed to monitor activities of household members.

[0008] FIG. **4** is a block diagram of an example apparatus that may be used to implement a portable metering and survey device that can be worn or carried by a person to monitor the activities of the person and present surveys to the person.

[0009] FIG. **5** is a block diagram of an example system that may be used to dynamically select survey questions to be presented to individual persons based on those persons' activities.

[0010] FIG. **6**A is a flow chart representative of example machine readable instructions that may be executed to implement the example system of FIG. **5** to dynamically select survey questions based on respondent activities.

[0011] FIG. **6**B is a flow chart representative of example machine readable instructions that may be executed to implement block **606** of FIG. **6**A.

[0012] FIG. **7** is a flow chart representative of example machine readable instructions that may be executed to implement the example portable device of FIGS. **1-4** to collect activity information and present survey questions to a survey respondent.

[0013] FIG. **8** is a block diagram of an example processor system that may be used to implement the methods and apparatus described herein.

[0014] FIG. **9** is an example matrix to display collected monitoring information reflecting the activity of a monitored family.

DETAILED DESCRIPTION

[0015] Although the following discloses example methods, articles of manufacture, apparatus and/or systems including, among other components, software executed on hardware, it should be noted that such methods, articles of manufacture, apparatus and/or systems are merely illustrative and should not be considered as limiting. For example, it is contemplated that any or all of these hardware and software components could be embodied exclusively in hardware, exclusively in software, exclusively in firmware or in any combination of hardware, firmware and/or software. Accordingly, while the following describes example methods, articles of manufacture, apparatus and/or systems, the examples provided are not the only way to implement such methods, articles of manufacture, apparatus and/or systems.

[0016] The example methods, articles of manufacture, apparatus and/or systems described herein can be used to present dynamically generated surveys or Smart Surveys™ by dynamically selecting questions to be presented to persons (e.g., consumers, survey panel members, etc.) via a portable device based on activities of those persons. In particular, the example methods, articles of manufacture, apparatus and/or systems described herein are configured to use monitoring information indicative of activities that are unique to a particular monitored person throughout a day to determine survey questions that are relevant to that person based on the person's activities. In this manner, unlike traditional surveys which present respondents with a predetermined, pre-populated list of questions with a limited branch structure in an attempt to be generally relevant to a

large group of people, the methods, articles of manufacture, apparatus and/or systems described herein can be used to generate dynamically adaptable surveys that can be tailored to be relatively more relevant than traditional surveys to each individual person surveyed and, thus, to collect more detailed and/or meaningful data. Thus, in these examples, the traditional cost of human surveyors are avoided without losing the adaptability of such human surveyors (e.g., without losing the surveyor's transparent real-time reactions to a respondent's experience, knowledge of the presented or related products (which may influence a respondent or a respondent walking away from a surveyor), etc.). The examples describe herein use intelligent software techniques that may impartially present important research questions to the respondents at times that are selected to obtain meaningful data while not wasting respondent resources (e.g., by avoiding mismatching respondents with survey topics).

[0017] To present survey questions to respondents, each respondent that has previously consented to participate in the survey program is instructed to carry a portable device having software, firmware and/or hardware therein to perform activity detection processes, present survey questions, and communicate survey answers to a central facility. The surveys are conducted at key pre-/post-purchase and/or advertisement exposure times, as detailed below. In some example implementations, the portable device may be implemented using a portable mobile device such as a mobile cellular telephone (e.g., a smart phone), a personal digital assistant (PDA), a portable music player (e.g., an IPod), a portable game machine (e.g., a video game player), a portable television, an automobile navigation system, and/or other devices that use Skype, Wi-Fi or other non-cellular based communications networks to communicate in real-time or near real-time, by, for example, downloading software to the mobile device and/or attaching hardware to the mobile device. In other examples, non-portable devices may also be used in place of or in addition to portable devices to present respondent with surveys. Example non-portable devices include televisions, set-top boxes, in-store television or digital display monitors and/or other devices that include two-way communications. In some examples, the respondents agree to have the example technology downloaded to their mobile device(s). Because the respondents have previously consented to participate in the surveys, the example methods and apparatus described herein avoid so-called "call-bank" solicitation or random dialing solicitation. The mobile device may be provided with software that causes it to emit a unique audible alert when it receives a survey question from a central facility that can be distinguished by a person as indicating that a survey question has been received and is ready for presentation. For example, there may be a distinct survey ringtone (that the respondent may associated as a "survey ringtone") to indicate that a survey opportunity is available and to which the respondent can reply or hit, for example, any key to park (i.e., delay) the survey for later attention. Additionally or alternatively, in some examples, the mobile device may use vibrations as the alert when it is desirable to have the audio alert silenced. Although the portable device may be implemented in any desired fashion (e.g., a PDA, a smart phone, a dedicated device, etc.), the presently preferred approach is to employ a cellular phone in this role. Accordingly, the following description will refer to a cellular phone as a preferred example implementation, but it should be understood that other devices could alternatively be used in this role. In addition, any of these devices may be used to detect the respondents' activities, present survey questions and/or collect responses.

[0018] To generate dynamically adaptable surveys, the example methods, articles of manufacture, apparatus and/or systems described herein monitor people's daily activities (e.g., activity at home, activity at work, daily routines, paths of travel, credit card usage history including past location of stores, specific purchases and/or pattern(s) of purchases), media exposure (e.g., advertisement exposure, television/radio programming exposure, etc.), product exposure (computer-related activity, etc.) by collecting monitoring information with activity monitoring apparatus and systems, comparing the collected monitoring information to predetermined patterns or rules that specify particular survey questions based on particular activity patterns or trends, and presenting the survey questions selected based on the comparison process and/or further analysis. In this manner, the example methods, articles of manufacture, apparatus and/or systems can be used to collect responses from survey respondents that are highly relevant and meaningful to the underlying subject matter of the survey questions due to the respondents' activities or media exposures related to that subject matter.

[0019] A dynamically generated survey such as a Smart Survey™ can be configured to automatically present itself on a portable device such as, for example, a mobile cellular telephone, when a combination of activity criteria have been met. Such combination of activity criteria can be predefined and provided as an activity rule, pattern, trend and/or change in pattern or trend (including for example, a break in a normal pattern such as not watching a television show that is normally watched or not going to work at the time this is normally done). An example activity rule can specify that a particular survey question is to be presented to a survey respondent when (a) the survey respondent is exposed to a particular advertisement for a first product X times (e.g., a television, radio or Internet advertisement, (b) the respondent has been exposed to a rival or competitor's advertisement for a second, competing, product Y times, and/or (c) the respondent is in a retail location/section where first and/or second products related to the television advertisements are available. By predefining activity rules or patterns that trigger the respective survey questions, the survey questions can automatically adapt based on past and/or current factors or activity criteria (e.g., which advertisements were consumed, the frequency of exposure to the advertisements, the media through which the exposure occurred (e.g., television channel, billboard, poster, radio station, webpage etc.), which store the respondent patronizes, other recent survey responses, speed of travel (e.g., the survey can be suppressed or delayed if a speed indicating that the respondent is driving is detected), etc.). By presenting survey questions on portable devices that can be carried or worn by survey respondents, the surveys can be conducted at locations and times that are highly relevant to the survey questions (e.g., point-of-sale locations and times, advertisement exposure locations and times, etc.). For example, if a person enters a retail establishment (e.g., a grocery store), the example methods, articles of manufacture, apparatus and/or systems described herein can be used to detect activity monitoring information indicative of the person's presence within the retail establishment, dynami-

cally select a survey question related to that retail establishment, and communicate the survey question to the person's portable device for presentation to the person. In addition, the survey questions, or portions thereof, may be transferred to the person's personal computer, game player or any other device. Each respondent can provide survey responses by keyboard, touch screen (if supported by the portable device) or other hand motion, or by voice response (e.g., via an audio sensor such as a microphone), whichever the user and/or system implementer prefers and/or supports. In some example implementations, a Smart Survey™ program is implemented using panel members that agree to participate in a market research study involving the dynamically generated surveys implemented in accordance with the example methods, articles of manufacture, apparatus and/or systems described herein.

[0020] To monitor a person's activity a portable device (e.g., consumer phones, game controllers, etc., a belt-mountable device or any of the other devices described herein) can be provided with one or more sensors and interfaces to detect, for example, movement, location, audio/video media, direction, etc. For example, the portable device could be provided with a global positioning system (GPS), WiFi locator, radio frequency (RF) signal based locators and/or other technology tracking/logging device(s) to generate location information (e.g., location coordinates) indicative of the locations and paths of travel of a person. The portable device could alternatively or additionally be provided with an electronic compass, an accelerometer, an altimeter, and/or interfaces for location and/or motion sensing. In some example implementations, the portable device can be configured to implement an inertia or dead-reckoning process to generate location information when the portable device is within a building in which GPS signals cannot be received. To determine the advertisements, products, retail establishments, etc. to which a person may be exposed based on the generated location information, the location information can be compared to location information stored in a database in association with names or identifiers of advertisements, products, retail establishments, etc. located at those locations. Additionally or alternatively, such comparisons and/or determinations can be based on collected audio (e.g., 'beacons'), RF, and/or infrared emissions received from an advertisement location, a store, an event location, a store shelf, a product, a product display, store doors, etc. In other examples, the portable device may include a GPS/three-axis accelerometer, or inertia detection capability to detect walking, standing, sitting, biking, running, driving or other motion-related activities that can be used as a further source of specific activity or as a means to detect an appropriate, safe or otherwise advantageous time to launch or not to launch a survey, as described below.

[0021] Further, a wireless component may be added to a bracelet, watch, necklace, pendant, ring, credit card, pen, coin-sized object or other similar device designed to be worn or carried inside a pocket that includes a three-axis or equivalent detection means to detect arm, wrist, body, and/or hand motion(s). Further, the device may include some form of wireless communications links (e.g., WiFi, WIMax, IR, etc.) to facilitate transfer of data (e.g., in real time, or near real time) from the respondent's portable device to a receiver at a media or consumer research company and/or to other portable devices. The devices may transmit information related to the respondent's activity including, for example, typing, instant messaging, playing video games, writing, reading, etc. This activity data can be used to select surveys, to select when to trigger a survey, and/or to identify pools of respondents to survey at future times based on historical activity records (e.g., that can be used to predict future availability at preferred survey times such as 5 hours after a commercial exposure or product usage, etc.)

[0022] The portable device may additionally or alternatively be equipped with a media measurement receiver to detect exposure to media (e.g., television, radio and/or the Internet). An example media receiver is an audio sensor such as a microphone or other device to collect audio output by a media device. A code or a signature can be collected from the audio to identify the media output by the media device (e.g., an advertisement). Methods and apparatus for performing such media exposure identification are described in, for example, U.S. Patent Publication No. 2005/0054285 entitled "Methods and Apparatus to Adaptively Select Sensor(s) to Gather Audience Measurement Data Based on a Variable System Factor and a Quantity of Data Collectible by the Sensors," which is hereby incorporated by reference in its entirety.

[0023] To monitor a person's activities within a home or other environment (e.g., work) where a person might regularly conduct daily activities the environment can be provided with sensors installed throughout the environment that can detect, for example, motion events, sound events, or other types of events that may be indicative of particular activities. The sensors may have small form factors for ease of mounting in different locations. For example, an activity sensor can be adhered to kitchen appliances (e.g., a refrigerator, a coffee maker, a microwave, a stove, etc.), dinette furniture (e.g., chairs), kitchenware, or other kitchen items to detect survey respondents' activities in their kitchen. The activity sensors can sense, for example, when a person makes coffee, drinks coffee, cooks, visits the refrigerator, etc. and wirelessly communicate information or signals indicative of the sensed activity to a home unit (e.g., a computer and/or a media intelligence company provided home unit) within the household. The home unit can subsequently communicate the activity information to a central facility of a market research entity conducting surveys. A dynamic survey system either on the portable device or located at the central facility can analyze (1) the activity information generated by the sensors throughout the household and/or (2) the activity information generated by portable devices carried by the household members to determine which survey questions to present and when to present those survey questions.

[0024] Turning to FIG. **1**, the example methods, articles of manufacture, apparatus and/or systems described herein can be implemented in indoor and/or outdoor environments of an example geographic area **100** to generate and conduct dynamically adapting surveys. Although, the example geographic area **100** is shown by way of example as a city or town having a residential area, a business area, an industrial area, etc., the example methods, articles of manufacture, apparatus and/or systems may be used in any area including indoor areas and/or outdoor areas.

[0025] As shown, the example geographic area **100** includes a plurality of structures and transportation mediums within which a person **102** (e.g., a survey respondent) having a portable monitoring and survey device **104** (e.g., the portable device **104**) may be monitored and surveyed. In

particular, the person **102** may be monitored and surveyed in a household **106**, in one or more retail establishments **108***a*, **108***b*, and **108***c* (e.g., a gas station **108***a*, a retail store **108***b*, and/or a recreational complex **108***c*), in a workplace structure **110**, in a train **112**, and/or in a car **114**. The example geographic area **100** also includes a plurality of advertisements **116** (e.g., billboards **116**) at locations that facilitate exposure to consumers.

[0026] The portable device **104** may be configured to obtain and/or generate activity-related information (e.g., location information, motion information, movement information, etc.) on a continuous, periodic or aperiodic basis. In particular, as described in greater detail below in connection with FIG. **4**, the portable device **104** may include one or more location or positioning devices that enable the portable device **104** to obtain location or position information using, for example, internal devices and/or one or more location information systems. For example, the example geographic area **100** also includes one or more location information systems that may be used for communication of location information with the portable device **104**. Specifically, the location information generation systems may include a plurality of radio frequency (RF) transceiver towers **118** and one or more satellites represented in FIG. **1** by a satellite **120** to implement GPS location processes.

[0027] The RF transceiver towers **118** may be implemented using any RF communication technology including cellular communication technology (e.g., GSM, CDMA, TDMA, AMPS, etc.). The RF transceiver towers **118** may be configured to transmit or broadcast positioning information and/or any type of other information that may be used by the portable device **104** to generate location information. The satellite **120** may also be used to communicate location-related information to the portable device **104**. For example, the satellite **120** may be used to implement any satellite positioning system (SPS) such as, for example, the global positioning system (GPS). The portable device **104** may receive the position information from the satellite **120** and determine location information associated with the locations to which the portable device **104** is moved.

[0028] The example methods, articles of manufacture, apparatus and/or systems described herein may be configured to generate path of travel information for the survey respondent **102** based on location, motion, and/or movement information to analyze the activities of the survey respondent **102**. For example, the paths of travel of the respondent **102** may be analyzed to determine places visited by the respondent **102** and/or to determine media (e.g., advertisements), products, retail establishments etc. to which the respondent was exposed. Example methods, articles of manufacture, apparatus and/or systems that may be used to generate and/or analyze path of travel information are described in U.S. patent application Ser. No. 11/668,919, filed on Jan. 30, 2007, which is hereby incorporated by reference herein in its entirety.

[0029] The portable device **104** may also be configured to generate and/or collect media exposure information associated with any media to which the person **102** may be exposed. For example, as described in greater detail below in connection with FIG. **4**, the portable device **104** may be configured to obtain codes and/or signatures (e.g., audio codes and or audio signatures) associated with video programs (e.g., DVD movies, television programming, etc.), audio programs (e.g., CD audio, radio programming, etc.), etc. Additionally, the portable device **104** may be configured to receive codes (e.g., audio codes and/or RF codes) associated with alternate forms of media including, for example, the billboards **116** or any other form of publicly viewable advertising (e.g., posters, in-store advertisement displays, etc.). For example, advertisements (e.g., the billboards **116**) may include audio broadcasting device(s) (not shown) and/or RF broadcasting device(s) (not shown) configured to emit respective codes that uniquely identify each advertisement and/or each billboard location. If the portable device **104** is in proximity of any of the billboards **116**, the portable device **104** may obtain the billboard code as media exposure information, thus indicating that the person **102** was exposed to one of the billboards **116** corresponding to the obtained billboard code. Example systems and methods for extracting or obtaining information such as, for example, billboard codes from media objects is described in U.S. Pat. No. 6,353,929, which is incorporated herein by reference in its entirety.

[0030] The portable device **104** may be configured to communicate location information, motion information, movement information, and/or media exposure information to a central facility **122** via a network **124** for subsequent analyses or processing. The central facility **122** may include an activity analyzer to analyze the activities of the person **102** to, for example, dynamically select survey questions for the person **102**. The network **124** may be implemented using any communication medium such as, for example, a cellular network, a satellite network, a public telephone switching network, a DSL network, a cable network, the Internet, etc. For example, the network **124** may be communicatively coupled to the plurality of RF transceiver towers **118** and/or to the satellite **120**.

[0031] FIG. **2** is a plan view of the household **106** and the retail store **108***b* of the example geographic area **100** of FIG. **1**. In the illustrated example, the household **106** includes a television **202** that can expose the survey respondent **102** to advertisements and/or television programming, for which the portable device **104** can generate media exposure information. The retail store **108***b* stocks products for sale and also includes advertisements **204** to which the survey respondent **102** can be exposed when walking through the retail store **108***b*. In the illustrated example, the retail store **108***b* includes a plurality of chirpers **206** (e.g., signal emitters) to emit codes that are unique to each advertisement **204**. In this manner, when the survey respondent **102** is in close enough proximity to one of the chirpers **206** to be exposed to a respective product or advertisement, the portable device **104** detects a chirp **206** which can be used to identify the product or advertisement to which the respondent **102** was exposed and, thus, to generate media exposure information. As shown, some of the chirpers **206** may be located at an entrance and/or an exit of the retail store **108***b* to log when survey respondents enter and/or exit the retail store **108***b*. By analyzing the Doppler Effect associated with the detected chirps, the direction (into or out of) of movement (e.g., walking direction) of the respondent can be determined. Some of the chirpers **206** may be located at the check out counters **208** to determine when respondents are at a point-of-sale location. In this manner, survey questions related to purchases or products or advertisements to which respondents were exposed can be presented to respondents when the respondents are checking out or have left the retail store **108***b*. As the respondent **102** moves through the

household **106**, the retail establishment **108***b*, and/or any other monitored place in the geographic area **100**, the portable device **104** collects activity information (e.g., location information, motion information, media exposure information, etc.) and communicates that activity information to the central facility **122**. The central facility **122** analyzes the received activity data to select survey questions relevant to the activities of the respondent **102**. Alternatively or additionally, logic (e.g., hardware, firmware and/or software) on the portable device may select and display the survey questions (e.g., without involving the central facility). The survey questions may be selected in real time or near real time to respond to "hot" client requests for immediate information resulting from any trigger (e.g., new product release, weather, host/spokesman/on-air personality closely associated with the product who has suffered negative publicity tarnishing his/her reputation, etc.).

[0032] FIG. **3** is a partial interior view of the household **106** of FIGS. **1** and **2** in which activity sensors **302** are placed to monitor activities of household members (e.g., the survey respondent **102**). Each activity sensor **302** can be implemented as a wireless tag that includes a battery, a transmitter, a microprocessor, and one or more of a plurality of different types of sensors. The sensors may be, for example, motion sensors, acoustic sensors, light sensors, electro-magnetic field sensors, etc. that detect when different household items are being used within the household **106** by household members (or guests). Each activity sensor **302** can be attached to a different household item to detect when that household item is in use. The activity sensors **302** can be relatively small (e.g., about half or a quarter of the size of a credit card) and can be affixed to products, cupboards, doors, appliances, chairs, under-sink water pipes, remote controls, computer keyboards, etc. The activity sensors **302** can be used to generate time and/or date stamped activity information indicative of usage of different household items and which can be used to correlate the usages with other household activities (e.g., When and how variable are mealtimes? Which family members eat what meals together? How long is preparation time prior to leaving the house for work or school? Are there any patterns in the order/timing of when household members leave from or return to the home? How often and when are the stove, microwave, refrigerator, etc. used? When is house cleaning done and what products/devices are used for that cleaning?). Additionally or alternatively, the sensor data can be used to detect directly (by audio, RF, infrared signal(s), etc.) the respondent's proximity to others in the room or coverage area space. Additionally or alternatively, by attaching a sound and/or vibration sensor under an eating surface, analysis of detected clicks can be used to determine the number of people eating. Further, signature patterns of these detected clicks can be used to determine which family members are eating.

[0033] In the illustrated example, the activity sensors **302** are attached to a refrigerator **304**, a coffee maker **306**, a kitchen faucet **308**, a couch **310**, and an entertainment system **312**. The type of sensor used for the refrigerator **304** may be a motion sensor, the type of sensor used for the coffee maker **306** may be an electro-magnetic field sensor or a temperature sensor, the type of sensor used for the faucet **308** may be an acoustic sensor, the type of sensor used for the couch **310** may be a motion sensor, and the type of sensor used for the entertainment system **312** may be an acoustic sensor.

[0034] When one of the activity sensors **302** detects that its respective household item is in use, it transmits activity notification information to a household data collection unit **314** which, in turn, communicates the activity information to the central facility for subsequent processing to select survey questions relevant to the activities of the household member (s) (e.g., the respondent **102**). In the illustrated example, each household member is provided with a respective portable device substantially similar or identical to the portable device **104**. To associate activities within the household **106** with respective household members, the activity information generated by the activity sensors **302** may be timestamped and location stamped (with a location identifier indicative of a location within which each of the activity sensors **302** is located). Similarly, location information generated by the portable devices of the household members can be timestamped. In this manner, the timestamped location information generated by the portable devices can be compared to the timestamped and location stamped activity information generated by the activity sensors **302** to determine which household member was involved in which particular activity (ies). This information facilitates communicating relevant survey questions to the correct household members.

[0035] FIG. **4** is a block diagram of an example implementation of the portable metering and survey device **104** of FIGS. **1-3** to monitor the activities of the survey respondent **102** and present survey questions to the respondent **102**. In general, the portable device **104** includes electronic components configured to detect and collect activity information (e.g., location information, motion information, movement information, media exposure information, etc.) and communicate the activity information to the central facility **122** (FIGS. **1-3**) for subsequent analyses. As shown in FIG. **4**, the portable device **104** includes a processor **402**, a memory **404**, a timing device **405**, a communication interface **406**, a plurality of media monitoring information sensors **408**, a plurality of location and motion sensors **410**, a plurality of output devices **412**, an input interface **414**, and a visual interface **416**, all of which are communicatively coupled as shown. In other example implementations, some of these components may be omitted, other components may be added, and/or two or more of some of the illustrated components may be provided.

[0036] The processor **402** may be any processor suitable for controlling the portable device **104** and managing or processing monitoring data related to detected media exposure or presentation information, location information, and/or motion information. For example, the processor **402** may be implemented using a general purpose processor, a digital signal processor, or any combination thereof. The processor **402** may be configured to perform and control different operations and/or features of the portable device **104** such as, for example, setting the portable device **104** in different operating modes, controlling a sampling frequency for collecting activity information, managing communication operations with other processor systems (e.g., the central facility **122** of FIGS. **1-3**), selecting location information systems (e.g., the RF transceiver tower **108**, the satellite **120**, etc.), selecting the next set of preloaded survey questions based on collected data, etc.

[0037] The memory **404** of the illustrate example is used to store collected activity information, program instructions (e.g., software, firmware, etc.), and/or any other data or information required to operate the portable device **104**. For

example, after collecting activity information, the processor **402** time stamps the information and stores the time stamped information in the memory **404**. The memory **404** may be implemented using any suitable volatile and/or non-volatile memory including a random access memory (RAM), a read-only memory (ROM), a flash memory device, a hard drive, an optical storage medium, etc. In addition, the memory **404** may be implemented by any removable or non-removable storage medium.

[0038] The timing device **405** of the illustrated example is implemented using a clock (e.g., a real-time clock), a timer, a counter, the clock date available from the cell phone, GPS system, the TV transmission, or any combination thereof. The timing device **405** is used to generate timestamps or to implement any timing operations. Although the timing device **405** is shown as separate from the processor **402**, in some implementations the timing device **405** may be integrated with the processor **402**.

[0039] The communication interface **406** of the illustrated example is used to communicate information between the portable device **104** and other systems such as, for example, the central facility of FIGS. **1-3**. The communication interface **406** may be implemented using any type of suitable wired or wireless transmitter and receiver or a transceiver that have bidirectional communication capabilities including, for example, a Bluetooth transceiver, an 802.11 transceiver, a cellular communications transceiver, an optical communications transceiver, etc.

[0040] The media monitoring information sensors **408** of the illustrated example include an audio sensor **418**, an optical sensor **420**, and an RF sensor **422**. Using the audio sensor **418**, the optical sensor **420**, and/or the RF sensor **422**, the example portable device **104** observes the environment in which the audience member **106** is located and monitors for media (e.g., advertisements, products, television/radio programming, etc.) and/or signals associated with media. When media presentations are detected via, for example, media identifier codes, the example portable device **104** logs or stores a representation of the media content in the memory **404** and/or identifies the media content, along with the time at which the media content is detected.

[0041] The audio sensor **418** may be, for example, a condenser microphone, a piezoelectric microphone or any other suitable transducer capable of converting audio information into electrical information. The optical sensor **420** may be, for example, a light sensitive diode, an infrared (IR) sensor, a complimentary metal oxide semiconductor (CMOS) sensor array, a charge-coupled diode (CCD) sensor array, etc. The RF sensor **422** may be, for example, a Bluetooth transceiver, an 802.11 transceiver, an ultrawideband RF receiver, and/or any other RF receiver and/or transceiver. While the example portable device **104** includes the audio sensor **418**, the optical sensor **420**, and the RF sensor **422**, the example portable device **104** need not include all of the sensors **418**, **420**, and **422**. For example, the audio sensor **418** is sufficient to detect audio-based media identifier codes. Additionally, the optical sensor **420** is sufficient to identify program content via image pattern recognition. However, because video monitoring generally requires a line of sight between the portable device **104** and the media delivery device, one particularly advantageous example includes the audio sensor **418** and the optical sensor **420**.

[0042] The location and motion sensors **410** of the illustrated example are configured to detect location-related information, motion-related information, and/or movement-related information and to generate corresponding signals that are communicated to the processor **402** to generate activity information. More specifically, the location and motion sensors **410** of the illustrated example include a motion sensor **424**, a satellite positioning system (SPS) receiver **426**, an RF location interface **428**, and a compass **430**.

[0043] Some of the location and motion sensors **410** may be configured to receive location-related information (e.g., encoded information, pluralities of fragmented information, etc.) and to perform any processing necessary to convert the received information to location information that indicates the geographic position at which the portable device **104** is located. The motion sensor **424** of the illustrated example is used to detect relatively small body movements of people (e.g., the survey respondent **102**), generate motion information related to the body movements, and communicate the motion information to the processor **402**. The motion sensor **424** may be implemented using any suitable motion detection device such as, for example, a mercury switch, a trembler, a piezo-gyroscope integrated circuit (IC), an accelerometer IC, etc. The motion information generated by the motion sensor **424** may be used to determine if the survey respondent **102** is wearing or carrying the portable device **104** and when the survey respondent **102** is active and/or inactive.

[0044] The SPS receiver (SPSR) **426** of the illustrated example is implemented using a global position system (GPS) receiver and is configured to generate location information based on encoded GPS signals received from GPS satellites. In general, the SPS receiver **426** may be used by the portable device **104** to collect location information in outdoor environments.

[0045] The RF location interface **428** of the illustrated example is implemented using a receiver or a transceiver and is used to receive location-related signals or information from location information systems such as, for example, the RF transceiver tower **108**. The RF location interface **428** may be implemented using any suitable RF communication device including, for example, a cellular communication transceiver, a Bluetooth transceiver, an 802.11 transceiver, an ultrawideband RF transceiver, etc. In addition, the RF location interface **428** may be implemented using only an RF receiver. Examples of location-based technologies that may be implemented in cooperation with the RF location interface **428** include the Ekahau Positioning Engine™ by Ekahau, Inc. of Saratoga, Calif., United States of America, an ultrawideband positioning system by Ubisense, Ltd. of Cambridge, United Kingdom or any of the ultrawideband positioning systems designed, sold and/or patented by Multispectral Solutions, Inc. of Germantown, Md., United States of America. Ultrawideband positioning systems, depending on the design, offer advantages including longer battery life due to lower power consumption, greater precision and such systems tend to use less of the available signal spectrum.

[0046] The Ekahau Positioning Engine™ may be configured to work with a plurality of stationary wireless communication protocol base units (e.g., 802.11, Bluetooth, etc.) to broadcast location-related information. By implementing the RF location interface **428** using a suitable wireless communication protocol device and communicatively cou-

pling stationary base units (not shown) to the RF location interface **428** using the same communication protocol, the Ekahau Positioning Engine™ may be used to generate location information. In particular, location-related information may be transmitted from the stationary base units, received by the RF location interface **428**, and used to generate location information using Ekahau Positioning software offered by Ekahau, Inc.

[0047] The Ubisense ultrawideband system may be used by providing a plurality of stationary ultrawideband transmitters (not shown) and implementing the RF location interface **428** using an ultrawideband receiver. In this manner, the RF location interface **428** can receive ultrawideband location-related information that is broadcast from the stationary ultrawideband transmitters so that the portable device **104** can generate location information based on the received ultrawideband signals.

[0048] The compass **430** of the illustrated example is implemented using a magnetic field sensor, an electronic compass IC, and/or any other suitable electronic circuit. In general, the compass **430** may be used to generate direction information, which may be useful in determining the direction in which a person (e.g., the survey respondent **102**) is facing. The direction information may be used to determine if a person is facing a television to enable consumption of and/or exposure to a television program. The direction information may also be used to determine if a person is facing, for example, a billboard advertisement so that when the portable device **104** receives an RF identification signal corresponding to the billboard advertisement and location information indicating that the survey respondent **102** is in front of the billboard, the direction information from the compass **430** may be used to determine if the survey respondent **102** is facing the billboard. In this manner, the portable device **104** can generate media exposure information indicating that the survey respondent **102** was exposed to the billboard content if the respondent actually faced (and, thus, likely saw) the billboard.

[0049] An example positioning technology that may be used in combination with the compass **430**, the motion sensor **424**, and the SPS receiver **426** is the Dead-Reckoning Module (DRM®) produced and sold by Honeywell International Inc. of Morristown, N.J. The DRM® is configured to enable generation and/or collection of location information within buildings (e.g., the household **106** of FIGS. **1-3**) and in outdoor environments. In general, when used outdoors, the DRM® uses GPS technology to collect location information. When used indoors, the DRM® uses, among other components, a compass (e.g., the compass **430**) and an accelerometer (e.g., the motion sensor **424**) to generate location information.

[0050] The plurality of output devices **412** of the illustrated example are used to, for example, capture the attention of or alert survey respondents (e.g., the survey respondent **102**), to present survey questions to audience members and/or to request input from survey respondents. The plurality of output devices **412** of the illustrated example includes a speaker **412***a*, a vibrator **412***b*, and a visual alert **412***c*.

[0051] The portable device **104** of the illustrated example also includes the input interface **414**, which may be used by a survey respondent (e.g., the survey respondent **102**) to input information to the portable device **104**. For example, the input interface **414** may include one or more buttons or a touchscreen that may be used to enter information, set operational modes, turn the portable device **104** on and off, etc. In addition, the input interface **414** may be used to enter portable device settings information, survey respondent identification information, etc.

[0052] The portable device **104** of the illustrated example further includes the visual interface **416**, which may be used in combination with the input interface **414** to enter and retrieve information from the portable device **104**. For example, the visual interface **416** may be implemented using a liquid crystal display (LCD) that, for example, displays detailed status information, location information, configuration information, calibration information, etc. The visual interface **416** may, alternatively or additionally, include light-emitting diodes (LEDs) that convey information including, for example, status information, operational mode information, etc.

[0053] FIG. **5** is a block diagram of an example system **500** that may be used to dynamically select survey questions to be presented to individual persons based on each person's activities. The example system **500** is implemented in the central facility **122** (FIGS. **1-3**). The example system **500** can be implemented using any combination of software, firmware and/or hardware. To store the respondent activity information that can be reported by the portable device **104** (FIGS. **1-4**) and/or the activity sensors **302** (FIG. **3**), the example system **500** is provided with a respondent activity monitoring database **502**. In the illustrated example, the respondent activity monitoring database **502** stores identifiers for different advertisements or products to which the survey respondent **102** has been exposed. The respondent activity monitoring database **502** stores use data indicative of use of the houseware item(s) of FIG. **3**. The respondent activity monitoring database **502** also stores travel pattern information indicative of different travel routes and travel modes that the respondent **102** has taken/utilized when moving between different locations including, for example, walking, local driving, long-distance driving, mass transit, air travel frequency and/or destinations (including an automatic determination of frequent flyer/non-frequent flyer status), etc. This is not an exhaustive list. The respondent activity monitoring database **502** may include many other types of monitoring data of interest including activities (e.g., sleep, exercise, shopping, etc.) of the respondent **102**, locations at which the respondent **102** has been, media to which the respondent **102** has been exposed, etc.

[0054] To specify the conditions under which particular survey questions should be selected, the example system **500** is provided with a criteria rules/patterns database **504**. The criteria rules/patterns database **504** stores rules or patterns that specify combinations of activities that a person (e.g., the survey respondent **102**) must perform to activate particular survey questions that are relevant to that person. For example, the criteria rules/patterns database **504** may store a rule specifying that when a person performs a particular activity (represented by an activity criterion in the respondent activity criterion database **502**) a predetermined number of times or in combination with another particular activity being performed a predetermined number of times, a particular survey or surveying question(s) should be presented to the person.

[0055] To store survey question for possible presenting to survey respondents, the example system **500** is provided with a survey questions database **508**. To store survey

responses received from survey respondents, the example system **500** is provided with a survey responses database **510**.

[0056] To analyze respondent activity monitoring data, the example system is provided with an activity analyzer **512**. The activity analyzer **512** compares respondent activity information stored in the respondent activity monitoring database **502** to rules or patterns in the criteria rules/patterns database **504** to determine when to select survey questions and which survey questions to select for each survey respondent participating in a survey program. In some examples, the respondent activity information may be updated (e.g., in real-time) and used to form a predictive schedule of the respondent's activity, which is discussed in greater detail below. The predictive schedule may be generated by a predictive scheduler **513** that, for example, may be coupled to or integral with the activity analyzer **512**.

[0057] To obtain survey questions based on the analyses performed by the activity analyzer **512**, the example system **500** is provided with a survey questions retriever **514**. When the activity analyzer **512** determines that activity information in the respondent activity monitoring database **502** meets one or more of the rules or patterns in the criteria rules/patterns database **504**, the activity analyzer **512** communicates a survey question identifier specified by that rule or pattern to the survey question retriever **514**. In turn, the survey question retriever **514** accesses the survey question database **508** to retrieve or obtain the survey question corresponding to the received survey question identifier and communicates the retrieved survey question to a communication interface **516**.

[0058] The communication interface **516** communicates survey questions to portable devices (e.g., the portable device **104**) of survey respondents. As discussed above, the portable devices may be implemented using a cellular mobile telephone. The cellular mobile telephone may be provided with software that causes it to emit a unique audible alert that can be distinguished by a person as indicating that a survey question has been received and is ready for presentation. The survey questions may be presented in the form of, for example, an email message, at text message, an instant message, etc. The communication interface **516** also receives responses from survey respondents provided via their portable devices. The communication interface **516** stores the responses in the survey responses database **510** for subsequent analysis. The communication interface **516** is also configured to receive activity information from the portable device **104** and the household data collection unit **314** and to store the activity information in the respondent activity monitoring database **502**.

[0059] While an example manner of implementing the example system of FIG. **5** has been illustrated in FIGS. **6**A and **6**B, one or more of the elements, processes and/or devices illustrated in FIGS. **6**A and **6**B may be combined, divided, re-arranged, omitted, eliminated and/or implemented in any other way. Further, the example processor **402**, the example memory **404**, the example timing deice **405**, the example communication interface **406**, the example media monitoring information sensors **408**, the example location and motion sensors **410**, the example output devices **412**, the example speaker **412***a*, the example vibrator **412***b*, the example visual alert **412***c*, the example input interface **414**, the example visual interface **416**, the example audio sensor **418**, the example optical sensor **420**, the example RF sensor **422**, the example motion sensor **424**, the example SPSR **426**, the example RF location interface **428**, the example compass **430**, the example respondent activity monitoring database **502**, the example criteria rules/patterns database **504**, the example survey questions database **508**, the example survey responses database **510**, the example activity analyzer **512**, the example questions retriever **514**, the example communication interface **516** and/or, more generally, the example portable device **104** and/or the example system **500** of FIGS. **4** and/or **5** may be implemented by hardware, software, firmware and/or any combination of hardware, software and/or firmware. Thus, for example, any of the example processor **402**, the example memory **404**, the example timing deice **405**, the example communication interface **406**, the example media monitoring information sensors **408**, the example location and motion sensors **410**, the example output devices **412**, the example speaker **412***a*, the example vibrator **412***b*, the example visual alert **412***c*, the example input interface **414**, the example visual interface **416**, the example audio sensor **418**, the example optical sensor **420**, the example RF sensor **422**, the example motion sensor **424**, the example SPSR **426**, the example RF location interface **428**, the example compass **430**, the example respondent activity monitoring database **502**, the example criteria rules/patterns database **504**, the example survey questions database **508**, the example survey responses database **510**, the example activity analyzer **512**, the example questions retriever **514**, the example communication interface **516** and/or, more generally, the example portable device **104** and/or the example system **500** could be implemented by one or more circuit(s), programmable processor(s), application specific integrated circuit(s) (ASIC(s)), programmable logic device(s) (PLD(s)) and/or field programmable logic device(s) (FPLD(s)), etc. When any of the appended claims are read to cover a purely software and/or firmware implementation, at least one of the example processor **402**, the example memory **404**, the example timing deice **405**, the example communication interface **406**, the example media monitoring information sensors **408**, the example location and motion sensors **410**, the example output devices **412**, the example speaker **412***a*, the example vibrator **412***b*, the example visual alert **412***c*, the example input interface **414**, the example visual interface **416**, the example audio sensor **418**, the example optical sensor **420**, the example RF sensor **422**, the example motion sensor **424**, the example SPSR **426**, the example RF location interface **428**, the example compass **430**, the example respondent activity monitoring database **502**, the example criteria rules/patterns database **504**, the example survey questions database **508**, the example survey responses database **510**, the example activity analyzer **512**, the example questions retriever **514**, the example communication interface **516** and/or, more generally, the example portable device **104** and/or the example system **500** are hereby expressly defined to include a tangible medium such as a memory, DVD, CD, etc. storing the software and/or firmware. Further still, the example portable device **104** of FIG. **4** and/or example system **500** of FIG. **5** may include one or more elements, processes and/or devices in addition to, or instead of, those illustrated in FIGS. **4** and/or **5**, and/or may include more than one of any or all of the illustrated elements, processes and devices.

[0060] A flowchart representative of example machine readable instructions for implementing the system **500** of

FIG. **5** is shown in FIGS. **6**A and **6**B. A flowchart representative of example machine readable instructions for implementing the portable device **104** of FIG. **4** is shown in FIG. **7**. In these examples, the machine readable instructions comprise a program for execution by a processor such as the processor **812** shown in the example computer **800** discussed below in connection with FIG. **8**. The program may be embodied in software stored on a tangible medium such as a CD-ROM, a floppy disk, a hard drive, a digital versatile disk (DVD), DVD-ROM, blu-ray disk, blu-ray ROM, BD-ROM or a memory associated with the processor **812**, but the entire program and/or parts thereof could alternatively be executed by a device other than the processor **812** and/or embodied in firmware or dedicated hardware in a well known manner. For example, any or all of the example processor **402**, the example memory **404**, the example timing deice **405**, the example communication interface **406**, the example media monitoring information sensors **408**, the example location and motion sensors **410**, the example output devices **412**, the example speaker **412***a*, the example vibrator **412***b*, the example visual alert **412***c*, the example input interface **414**, the example visual interface **416**, the example audio sensor **418**, the example optical sensor **420**, the example RF sensor **422**, the example motion sensor **424**, the example SPSR **426**, the example RF location interface **428**, the example compass **430**, the example respondent activity monitoring database **502**, the example criteria rules/patterns database **504**, the example survey questions database **508**, the example survey responses database **510**, the example activity analyzer **512**, the example questions retriever **514**, the example communication interface **516** and/or, more generally, the example portable device **104** and/or the example system **500** etc. could be implemented by software, hardware, and/or firmware. Further, although the example program is described with reference to the flowcharts illustrated in FIGS. **6**A, **6**B and **7**, many other methods of implementing the example system **500** and/or the example portable device **104** may alternatively be used. For example, the order of execution of the blocks may be changed, and/or some of the blocks described may be changed, eliminated, or combined.

[0061] FIG. **6**A is a flow chart representative of example machine readable instructions that may be executed to implement the example system **500** of FIG. **5** to dynamically select survey questions based on respondent activities. In the example of FIG. **6**A, the communication interface **516** (FIG. **5**) receives activity information from the portable device **104** (FIGS. **1**-**4**) and the household data collection unit **314** (FIG. **3**) (block **602**) and stores the activity information in the respondent activity monitoring database **502** (FIG. **5**) in association with a survey respondent identifier (block **604**). The activity analyzer **512** (FIG. **5**) analyzes the received activity information in the respondent activity monitoring database **502** to determine whether any of the rules or patterns in the criteria rules/patterns database **504** have been satisfied or met (block **606**).

[0062] FIG. **6**B is a flow chart representative of example machine readable instructions that may be executed, for example by the activity analyzer **512**, to implement block **606** of FIG. **6**A. The process shown in FIG. **6**B is just one example process that may be conducted to implement block **606**. Other processes may be performed in place of or in addition to the process detailed in FIG. **6**B to implement additional or alternative rules for initiating surveys. In the example shown in FIG. **6**B, the activity analyzer **512** reviews the respondent activity information (block **650**). When reviewing the respondent activity information, the activity analyzer **512** counts, for example via a counter (not shown), the number of exposures to a product, advertisement and/or location such as, for example, a client's product, advertisement, or a location in which a client's product or advertisement is expected to appear (block **652**).

[0063] The activity analyzer **512** determines, for example via a comparator (not shown), if the number of exposures to a product, advertisement and/or location is above a first threshold value (block **654**). The first threshold value may be any number including, for example, one, two, three, four, etc. If the number of exposures to a product, advertisement and/or location is not above the first threshold value, then the stored activity information does not satisfy the rule or pattern examined in FIG. **6**A and control is returned to block **602** of FIG. **6**A.

[0064] If the number of exposures to a product, advertisement and/or location exceeds the first threshold value, the activity analyzer **512** counts the number of exposures to a second product or advertisement such as, for example, a product or advertisement of a rival (e.g., a competitor of the client) (block **656**). Exposure to an advertisement may be detected by counting recorded codes associated with the advertisement or detecting the user's presence (e.g., travel pattern history) at a location in which the rival's product or advertisement appears or is expected to appear.

[0065] The activity analyzer **512** determines if the number of exposures to a rival product, advertisement and/or location is above a second threshold value (block **658**). The second threshold value may be any number including, for example, one, two, three, four, etc. The second threshold value may be the same as or different than the first threshold value. If the number of exposures to a rival product, advertisement and/or location is not above the second threshold value, then the stored activity information does not satisfy the rule or pattern tested in FIG. **6**Bs (block **606** of FIG. **6**A) and control is returned to block **602** of FIG. **6**A.

[0066] If the number of exposures to a rival product, advertisement and/or location exceeds the second threshold value (block **658**), the activity analyzer **512** determine if the respondent is in a location in which a client's and/or rival's product(s) and/or advertisement(s) are expected to appear (block **660**). If the respondent is not in a location in which a client's and/or rival's product(s) and/or advertisement(s) are expected to appear, then the stored activity information does not satisfy the rule or pattern tested in FIG. **6**B and control is returned to block **602** of FIG. **6**A.

[0067] If the respondent is in a location in which a client's and/or rival's product(s) and/or advertisement(s) are expected to appear (block **660**), then the stored activity information does satisfy the rule or pattern applied by FIG. **6**B and control advances to block **608** of FIG. **6**A.

[0068] Although application of a specific example rules is shown in FIG. **6**B, one or more other rules may additionally or alternatively be applied.

[0069] Returning to block **606** in FIG. **6**A, as noted above, if none of the rules or patterns have been met (block **606**), control returns to block **602**. If any of the rules or patterns have been met (block **606**), the activity analyzer **512** communicates one or more survey question identifier(s) stored in association with the satisfied rule(s) or pattern(s) that have been met to the survey questions retriever **514** (FIG. **5**)

(block **608**). In some instances only a single survey question may be triggered based on a respondent's activity, while in other cases, the respondent's activity may trigger selection of numerous survey questions. At block **608**, the activity analyzer **512** can also communicate the survey respondent identifier corresponding to the activity that triggered the rule or pattern. In this manner, the communication interface **516** can use the respondent identifier to communicate selected survey questions to the portable device corresponding to the survey respondent whose activity triggered selection of the survey questions.

[0070] The survey questions retriever **514** retrieves one or more survey question(s) (block **610**) from the survey questions database **508** corresponding to the survey question identifier(s) received from the activity analyzer **512**. The activity analyzer **512** determines if it is safe to communicate the survey question(s) to the respondent (block **611**) by, for example, reviewing the respondent's location information and the rate at which the location information is changing. If the location information is changing at a rate faster than a certain limit (e.g., faster than a human could walk or run), the rate of change of the respondent's location may indicate that the respondent is driving. If the respondent is driving, it may be unsafe to communicate survey question(s) to the respondent. The communication of the survey question(s) will thus be delayed (block **613**) or otherwise suppressed. The activity analyzer **512** will continue to analyze the respondent's location information until it determines that it is safe to communicate survey question(s) (block **611**).

[0071] If it is determined that it is safe to communicate survey question(s) to the respondent, the communication interface **516** communicates the survey question(s) to the portable device (e.g., the portable device **104**) of the survey respondent (e.g., the survey respondent **102**) corresponding to the activities that triggered selection of the survey question(s) (block **612**). When the communication interface **516** receives one or more response(s) from the survey respondent (block **614**), the communication interface **516** stores the response(s) in the survey responses database **510** (block **616**). Control of the example process then advances to block **602**. If the communication interface **516** does not receive response from the respondent (block **614**), control may advance to block **602**. In some example implementations, the communication interface **516** may not receive a response within a short time. For example, if the survey respondent **102** elects not to answer received survey questions immediately, there may be some delay between the time that the portable device **104** receives a survey question and the time that the survey respondent **102** submits a response. In some instances, the survey respondent **102** may wait to respond until numerous survey questions have been received.

[0072] As noted above, when no response is available for processing (block **614**), control returns to block **602**. When a response has been received (block **614**), control advances to block **616** where the response is stored in the survey responses database (block **616**). Although FIGS. **6**A and **6**B are illustrated as single control paths for simplicity, the machine readable instructions represented by FIGS. **6**A and **6**B included multiple routines or threads operating in parallel to process activity data received from respondents, determine if survey question(s) have been triggered, transmit surveys and receive survey answers.

[0073] FIG. **7** is a flow chart representative of example machine readable instructions that may be executed to implement the example portable device **104** of FIGS. **1-4** to collect activity information and present survey questions to the survey respondent **102**. The portable device **104** detects a location of the survey respondent **102** and generates corresponding location information (block **702**) using one or more of the location and/or motion devices described above in connection with FIG. **4**. The portable device **104** then determines whether it has detected any media or subjects of interest (e.g., advertisements, audio/video presentations, products, etc.) (block **704**) using, for example, any media detection devices described above in connection with FIG. **4**. If media has been detected, the portable device **104** generates media exposure information indicative of the media or subject of interest to which the survey respondent **102** was exposed (block **706**). After generating the media exposure information (block **706**) or if media was not detected (block **704**), the portable device **104** communicates activity information including the location information and/or the media exposure information to the central facility **122** (FIGS. **1-3**) (block **708**). In this manner, the example system **500** at the central facility **122** can analyze the activity information as described above in connection with FIG. **6**A to determine whether to present a survey question to the survey respondent **102**. In some examples, the portable device **104** may include the necessary logic (e.g., the processes described above with respect to FIGS. **6**A and **6**B) to generate or present one or more survey question(s) itself without communicating with the central facility **122**. By communicating the data it collects at frequent intervals, the portable device makes it possible to present surveys at times when the respondent has recently been or is even about to be exposed to a subject (e.g., an advertisement) of interest thereby enabling collection of data reflecting the respondent's actual reaction (as opposed to remembered actions) to the subject.

[0074] If the portable device **104** receives one or more survey question(s) from the central facility **122** (block **710**), or generates or presents the survey question(s) itself, the portable device **104** emits a notification sound to notify the survey respondent **102** that one or more survey questions are ready to be presented (block **712**). The notification sound may be a unique ring tone or alert that the survey respondent **102** can associate with having received a survey question. In the illustrated example, the portable device **104** is configured to offer the survey respondent **102** the option to delay providing responses until some later time. If the portable device **104** receives a delay request from the survey respondent **102** (block **714**), the portable device **104** sets a timer (e.g., the timing device **405** of FIG. **4**) to a predetermined duration (block **716**), the expiration of which will cause the portable device **104** to emit a reminder notification about the pending survey questions. In this manner, the survey respondent **102** has the option to wait to respond in case, for example, the respondent **102** is too busy to respond at a particular time. When the survey respondent **102** responds to the survey question(s) (block **716**), the portable device **104** communicates the response(s) to the central facility **122** (e.g., via an email, text message, or any other communication vehicle) (block **718**).

[0075] After communicating the response(s) to the central facility **122** at block **720** or if no survey questions were received at block **710**, the portable device **104** determines whether it should continue monitoring (block **720**). For example, if the portable device **104** is still powered on and

the survey processes have not been disabled, the portable device **104** determines that it should continue monitoring and control returns to block **702**. Otherwise, the example process of FIG. **7** is ended.

[0076] FIG. **8** is a block diagram of an example processor system **810** that may be used to execute the example machine readable instructions of FIGS. **6**A, **6**B and **7** to implement the example apparatus, systems, and/or methods described herein. As shown in FIG. **8**, the processor system **810** includes a processor **812** that is coupled to an interconnection bus **814**. The processor **812** may be any suitable processor, processing unit or microprocessor. Although not shown in FIG. **8**, the system **810** may be a multi-processor system and, thus, may include one or more additional processors that are identical or similar to the processor **812** and that are communicatively coupled to the interconnection bus **814**.

[0077] The processor **812** of FIG. **8** is coupled to a chipset **818**, which includes a memory controller **820** and an input/output (I/O) controller **822**. The chipset provides I/O and memory management functions as well as a plurality of general purpose and/or special purpose registers, timers, etc. that are accessible or used by one or more processors coupled to the chipset **818**. The memory controller **820** performs functions that enable the processor **812** (or processors if there are multiple processors) to access a system memory **824** and a mass storage memory **825**.

[0078] The system memory **824** may include any desired type of volatile and/or non-volatile memory such as, for example, static random access memory (SRAM), dynamic random access memory (DRAM), flash memory, read-only memory (ROM), etc. The mass storage memory **825** may include any desired type of mass storage device including hard disk drives, optical drives, tape storage devices, etc.

[0079] The I/O controller **822** performs functions that enable the processor **812** to communicate with peripheral input/output (I/O) devices **826** and **828** and a network interface **830** via an I/O bus **832**. The I/O devices **826** and **828** may be any desired type of I/O device such as, for example, a keyboard, a video display or monitor, a mouse, etc. The network interface **830** may be, for example, an Ethernet device, an asynchronous transfer mode (ATM) device, an 802.11 device, a digital subscriber line (DSL) modem, a cable modem, a cellular modem, etc. that enables the processor system **810** to communicate with another processor system.

[0080] While the memory controller **820** and the I/O controller **822** are depicted in FIG. **8** as separate blocks within the chipset **818**, the functions performed by these blocks may be integrated within a single semiconductor circuit or may be implemented using two or more separate integrated circuits.

[0081] As noted above, in some examples, the respondent activity information may be updated (e.g., in real-time) and used to form a predictive schedule of the respondent's activity. In media research, certain time frames after exposure to a product/service are generally accepted and/or standardized as the optimal time for presenting a survey so that different surveys for different products can be compared in a recall analysis. These standardized recall time frames include, for example, instantly or substantially instantly, a five-hour recall, a five-day recall or a five-week recall. Other time frames may also be standardized. Using the predictive scheduling capabilities, the example methods and systems described herein can recognize that at a particular recall time interval, a respondent may or may not be expected to be busy. That is, a particular recall time may not be an appropriate time to initiate a survey for a particular respondent based on a respondent's historical behavior patterns/availability. For example, a respondent that generally, if not always, drives from work to home at, for example, the five-hour recall time after a key triggering event/exposure to a product or survey trigger (which may be an optimum recall period in some examples) would likely be unable to respond to survey questions at that time. As a result, the survey questions may be slightly delayed or presented during another recall time period. Alternatively, the respondent may be dropped from the pool of respondents to be surveyed based on this predicted unavailability.

[0082] A matrix of all respondents that have met the survey triggering criteria and the respondent's predictive schedules/availabilities during their specific (but, perhaps different) standardized response times may be compiled (e.g., by the example activity analyzer **512** cooperating with the predictive scheduler **513**) and used to calculate, forecast and select a likely successful pool of respondents that should be available for various time-dependent surveys (e.g., five-minute recall, five-hour recall, etc.). Based on the respondents' predicted schedules, the example processes described herein can determine which survey question(s) should be assigned or sent to which respondents to increase the likelihood of receiving responses to the survey questions, which, in turn, improves the surveying company's ability to meet the requirements of their client who wants the survey information and/or an analysis thereof. The assignment of surveys to respondents may also be based on one or more of: respondent demographic information, respondent activity information, or other criteria to best meet the client's requirements. If more than enough respondents are predicted to be available at the standard recall time(s) to meet the survey/client's desired goals, then other available respondents may not receive the survey questions but may instead be saved for other surveys or later secondary surveys (e.g., a five-day recall). Furthermore, delaying survey questions to some of the respondents decreases the likelihood that a respondent will feel overloaded during a particular time frame.

[0083] In addition, if it is determined (e.g., by the example activity analyzer **512**) that one or more respondents fall within some defined tolerance based on, for example, respondent demographic information, respondent activity information, prior availability, commuting regularity and/or other criteria, these respondents may be selected to receive survey questions to form a minimum variance group for one or more recall time periods.

[0084] Furthermore, respondents in any of the examples described herein may be sent one or more survey reservations prior to an actual anticipated recall time (with or without any details of the specific nature of the survey). The respondent could accept the suggested time or offer an alternative time that may be automatically accepted/checked by the auto/predictive scheduler **513**. If the respondent is not available at the requested time, other times (for examples times that would advantageously meet the client requirements) may be offered.

[0085] As noted above, the predictive schedule may be generated by a predictive scheduler **513** that, for example, may be coupled to or integral with the activity analyzer **512**.

In these examples, the predictive scheduler **513** and/or the activity analyzer **512** may use any or all of the example processes, predictive information and/or artificial intelligence logic as detailed herein for predicting and/or selecting in real-time respondents who have met the triggering event/exposure criteria for a real-time survey launch, but which may likely be available or not available. The predictive scheduler **513** and/or the activity analyzer **512** uses any or all of the data (e.g., including respondent activity information, availability data, etc.) to monitor, adjust and/or augment a list or determination of qualified or preferred respondents to increase the likelihood of meeting the requirements of the client. The predictive scheduler **513** and/or the activity analyzer **512** makes these determinations with minimum negative impact to the availability of respondents who have also met (or likely will meet) triggering event/exposures criteria for other survey questions, but whose characteristics may make them more difficult to obtain as survey participants. For example, depending on the recall time requirements, the predictive scheduler **513** and/or the activity analyzer **512** may not select a rare respondent (e.g., a respondent with unusual demographic characteristics) to participate in a survey for Coke, because the Coke survey likely will have an abundance of participants and this particular respondent should remain available and eligible for a second survey (e.g., a survey for expensive automobiles), which may have a more difficult time in obtaining enough participants to meet the client's requirements.

[0086] By tracking individual and/or family activity using the techniques described above, the above described methods and/or apparatus may be used to generate a dashboard or matrix reflecting individual and/or family activity throughout a monitored time period (e.g., throughout the day). An example of such a matrix is shown in FIG. **9**.

[0087] The portable device **104** described above may be structured to be communicatively coupled to a laptop or desktop computer (hereinafter "general purpose computer") at the respondent's home or place of business in order to synchronize the device and/or load data to/from the device. Attachment to a general purpose computer for such a synchronization process can be used as a trigger to automatically present secondary and/or more detailed survey questions (e.g., questions relating to earlier answered questions but delving into the topic in greater detail) to the respondent. Alternatively, such secondary and/or more detailed questions can be triggered by other events and/or by manual initiation of the same.

[0088] Attachment to a general purpose computer may also trigger compilation and/or display of a simple or hierarchical/nested summary of the respondents activities for a given time period (e.g., day(s), week, month time). This summary may be in the form of the matrix shown in FIG. **9**. The summary/matrix may be presented for the respondent and editable for the purpose of permitting the respondent to correct, complete, and/or supplement the collected data.

[0089] The portable device **104** of the illustrated examples can be structured to automatically and systematically release incentives/awards/points/coupons or payments to cooperative respondents to encourage continued participation.

[0090] Incentives are a huge cost component of surveys and, therefore, it is important to optimize implementing the appropriate level(s) and frequency of incentives. Such incentive programs are usually administered using broad, general triggers and wide incentive level divisions because of the overwhelming workload to individually administer such systems on a per-person level.

[0091] The above disclosed examples substantially improve the efficiency of incentives by: (a) enabling automatic generation of person-by-person incentives based on their specific performance (which is possible due to the user monitoring data collected and the survey answers provided on an individual basis; (b) enabling the detection of early signs of interest fall-off and response thereto by one or more of: (1) offering incentives, and (2) sending messages directly (e.g., generated on phone by software on the phone and/or central processor); (c) enabling immediate distribution of incentives (e.g., a discount or gift related to the physical location of the respondent at the time the inventive/gift is offered such as, for example, at the time the survey is answered) when cooperators' actions occur to thereby achieve maximum incentive impact; (d) enable experimentation with which incentive types work best on a person-by-person basis.

[0092] Incentives of any type may be used. For example, ring tones and/or music and/or coupons may be emailed by the central processor or "X % off coupons" may be displayed directly on the portable device (e.g., phone) screen.

[0093] Additionally or alternatively, the monitoring information collected by the above described portable devices may be analyzed in either real-time using, for example, on portable device algorithms or via the central facility post processing. In the latter case, the results may be automatically matched to other respondents using any type of selection/comparison algorithm(s) to detect similarities and/or differences such as, for example, physical location, age, gender, income, or positive or negative ratings data. Many other possible match criteria could alternatively or additionally be employed. These automatically matched groups can be automatically brought together in a live (or off-line) virtual network enabled administration of a joint "Smart Survey" using either their portable devices or via a self-executing email to their personal PCs where these automatically selected cooperators or collaborators are able to compare their survey results with the results of others. The cooperative respondents could also virtually interact with other cooperative respondents to jointly build a single joint group survey result. The purpose of this feature is to test firmness of opinions, susceptibility to peer/social input of a survey product, and automatically generate survey questions (e.g., follow up questions) to dive deeper into the reasons behind significant differences between large group categories. Again it is emphasized that this may all be done by automatic selection of appropriate questions for a pre-stored database of questions, thereby enabling the avoidance of costly, time consuming direct human involvement.

[0094] For example, two or more respondents, who have met a triggering event (e.g., a commercial or product exposure), may be automatically selected to participate in a cooperative or collaborative smart survey. Such a collaborative survey would allow one or more answers given by a first respondent to be presented to a second respondent as part of that second respondent's survey to solicit their reaction/response. Thus, for example, a collaborative smart survey may be sent to a known Coke drinker about a new soft drink, and his answers to that survey may be (anonymously) sent to a known Pepsi drinker for his reaction to the Coke supporter's reaction. A non smoker may be selected to react to a smoker's survey. A Republican may be selected to react

to a Democrat's survey responses. A younger adult may be selected to respond to an elderly adult's results, male to female, citizen to non-citizen, various ethnicities to others, any group(s) to any other group(s), etc. In addition, any combination of criteria may be used to select respondents for collaborative smart surveys. For example, a first group of respondents who are Republicans who smoke may respond to survey questions based on the responses to a survey by Democrats who commute using their own car.

[0095] Any combination of criteria may be used. In these examples, the respondents may communicate in a one-to-one manner, two-on-one, or in an aggregate environment such as, for example, a list-serve type communication. In addition, the collaborative smart surveys may involve whole groups reacting to specific or averaged results of other whole groups or specific individuals. These examples allow a media or consumer research company to gather data without directly participating or arbitrating a discussion or debate.

[0096] The example surveys described herein may use either or both of two types of surveys, namely, closed-ended and open-ended. Closed-ended surveys offer a set of answers (e.g., three to five options of possible answers), and the respondent is asked to select the answer closest to his/her feeling/response. Because of the limited set of allowed responses with closed-ended surveys, the back office or tabulation process including the calculation of quantitative percentages, correlations, final tallies, etc. are straight forward. However, closed-ended surveys may overlook and not gather unexpected feelings or responses that were unanticipated in the design or range of allowed responses because the respondent must select within the allowed choices even though none of the choices really represents the respondent's true feelings. Thus, the respondent is forced to select a response that comes the closest to their preferred response, even though the selected response may be inaccurate.

[0097] An open-ended survey asks that the respondents enter their opinion or response in their own words. While open-ended surveys may actually come closer to the real feelings of the sampled group of respondents, the solicited responses are more difficult to later analyze because of the freedom to use variable words that represent the respondents' thoughts. Spelling and variable word choice may cause processors to misinterpret their intended meaning. Not only are the word(s) that are used important, but the sentence structure, grammar, spelling, variety of adjectives and adverbs, breadth and depth of vocabulary also reveal not just the intended opinion, ranking and/or response to the survey question, but also the level of education, observation and expression skills of the respondents. This information may be rich and meaningful feedback for the present survey or for use in developing future surveys and/or focus groups.

[0098] The example Smart Surveys described herein may implement smart text analytics. Smart text analytics employ text analytics that provide real-time forensics of a respondent's initial open-ended text responses. Based on that analysis the Smart Survey adjusts to a similar writing style by auto-formatting subsequent questions. Smart text is implemented on an on-going basis through the survey. Not only is the writing style adjusted, but the level of detail requested may also be increased or decreased. For example, a respondent volunteering to type a three sentence response to a question and offering more and/or fine line detail beyond the initial focus of the question reveals that this respondent has a willingness, ability, and time to offer more significant insights to the subject matter questioned. The example Smart Surveys and smart text analytics can auto-engage such a respondent to greater depths with acceptable risks. Further, if asking more detail begins to result in increased survey dropout rates, the auto-test analytics may self-adjust to further limit depth of questions, length of remaining survey, and/or reorder remaining question areas so as to maximize depth of feedback without losing the respondent.

[0099] Additionally or alternatively, to facilitate entry in the live/mobile environment, the portable devices described above may employ many input friendly features/capabilities. Such features include icons (like smiley faces, dollar signs, $, etc.) and specific feedback sounds to aid fast and accurate entry. Additionally or alternatively, voice recognition may be employed with optimized commands to further improve speed/ease of survey inputs. An example of such voice recognition session may include the respondent saying:

[0100] (a) "YES," in response to the question "do you want to complete the survey now?" (in response to the respondent's answer, the portable device may sound a short tune');

[0101] (b) "VALUE" (in response to this command from the respondent, a dollar sign icon may turn to a bold font and start blinking). If the respondent then says a numeral such as "TWO" (indicating two dollar signs), the portable device may sounds two cash-register "chu-chings;" and

[0102] (c) "NEXT," (in response to this command from the respondent, a next icon may turn to a bold font and the dollar sign icon un-bolds).

[0103] In the examples described herein, a survey may not be limited to traditional text-based questions and answers, but can also take the forum of asking the respondent to perform an action such as, for example, to take a picture at a certain time and/or at a certain object, area, direction, or activity. Any or all of the details of the example systems and methods described above would apply to the activity-based surveys. For example, when one or more triggering conditions or other criteria are met (e.g., client requirements, time passage, location inside a triggering store or department such as a men's department), a respondent may be instructed to take a picture of an identified area and/or activity. The specific instructions and/or possibilities may include, without limitation, to take a photo of shelving and/or racks (to determine levels of stocking, variety, number of shoppers in the area, neatness, cleanliness, dominate colors, styles), to take a photo of other shoppers (to determine what other shoppers are wearing and/carrying such as logos and/or bags from other stores and to determine clues to weather conditions such as rain coats, heavy jackets, no jacket/short sleeves, etc.), to take a photo of check out areas (to determine length of lines, number of customers, total number of cash registers, ratio of open/closed registering), to take a photo of a front of a store (to determine signage, store sales, decoration, site impairments, style, lighting, presence of people) and/or to take general pictures that best describe what activity the respondent(s) are undertaking (e.g., a picture of laundry may indicate that the respondent was doing laundry, a picture of a soccer game may indicate the respondent was taking a kid to a soccer game, a television may indicate watching television, a car lot may indicate looking around a car lot and/or buying a car, an inside of a bus or train may indicate traveling on a bus or train, a desk with papers may indicate working and/or doing homework

at a desk, a movie screen may indicate going to the theatre, a crowd at a mall may indicate shopping at a mall, etc.).

[0104] Although certain methods, apparatus, articles of manufacture and/or systems have been described herein, the scope of coverage of this patent is not limited thereto. To the contrary, this patent covers all methods, apparatus, articles of manufacture and/or systems fairly falling within the scope of the appended claims either literally or under the doctrine of equivalents.

What is claimed is:

1. An apparatus, comprising:

at least one memory;

instructions; and

processor circuitry to execute the instructions to:

determine a number of exposures to at least one of an advertisement or a product based on feedback from at least one of a microphone or a radio frequency (RF) sensor of a portable device, the microphone to detect audio from first media associated with the at least one of the advertisement or the product, the RF sensor to detect an RF signal from an RF broadcast device adjacent second media associated with the at least one of the advertisement or the product, ones of the exposures corresponding to respective ones of the first and second media;

retrieve a survey question based on the number of exposures satisfying a rule, the rule to control selection of the survey question;

identify a recall time when the survey question is to be presented, the recall time corresponding to a duration after satisfaction of the rule; and

offer, at the recall time, the survey question related to the at least one of the advertisement or the product via the portable device.

2. The apparatus of claim **1**, wherein the second media is distinct from and located apart from the first media.

3. The apparatus of claim **1**, wherein the recall time is to be after conclusion of exposure to the first media and the second media.

4. The apparatus of claim **1**, wherein the rule is a first rule, and the processor circuitry is to:

track human activity;

generate a predicted schedule based on the human activity; and

identify the recall time to present the survey question by evaluating the predicted schedule against a second rule.

5. The apparatus of claim **4**, wherein the processor circuitry is to:

track location information; and

generate the predicted schedule based on the location information.

6. The apparatus of claim **1**, wherein the portable device is a first portable device, the processor circuitry to cause a response to the survey question to be provided to a second portable device.

7. The apparatus of claim **1**, wherein the number of exposures is a first number of exposures, the at least one of the advertisement or the product is at least one of a first advertisement or a first product, the rule to include the first number of exposures to the at least one of the first advertisement or the first product satisfying a first threshold number of times and a second number of exposures to at least one of a second advertisement or a second product satisfying a second threshold number of times, the second advertisement being different than the first advertisement, and the second product being different than the first product.

8. A hardware storage device comprising machine readable instructions that, when executed, cause processor circuitry to at least:

determine a number of exposures to at least one of an advertisement or a product based on feedback from at least one of a microphone or a radio frequency (RF) sensor of a portable device, the microphone to detect audio from first media associated with the at least one of the advertisement or the product, the RF sensor to detect an RF signal from an RF broadcast device adjacent second media associated with the at least one of the advertisement or the product, ones of the exposures corresponding to respective ones of the first and second media;

retrieve a survey question based on the number of exposures satisfying a rule, the rule to control selection of the survey question;

identify a recall time when the survey question is to be presented, the recall time corresponding to a duration after satisfaction of the rule; and

offer, at the recall time, the survey question related to the at least one of the advertisement or the product via the portable device.

9. The hardware storage device of claim **8**, wherein the second media is distinct from and located apart from the first media.

10. The hardware storage device of claim **8**, wherein the recall time is to be after conclusion of exposure to the first media and the second media.

11. The hardware storage device of claim **8**, wherein the rule is a first rule, and the instructions cause the processor circuitry to:

track human activity;

generate a predicted schedule based on the human activity; and

identify the recall time to present the survey question by evaluating the predicted schedule against a second rule.

12. The hardware storage device of claim **11**, wherein the instructions cause the processor circuitry to:

track location information; and

generate the predicted schedule based on the location information.

13. The hardware storage device of claim **8**, wherein the portable device is a first portable device, the instructions to cause the processor circuitry to cause a response to the survey question to be provided to a second portable device.

14. The hardware storage device of claim **8**, wherein the number of exposures is a first number of exposures, the at least one of the advertisement or the product is at least one of a first advertisement or a first product, the rule to include the first number of exposures to the at least one of the first advertisement or the first product satisfying a first threshold number of times and a second number of exposures to at least one of a second advertisement or a second product satisfying a second threshold number of times, the second advertisement being different than the first advertisement, and the second product being different than the first product.

15. A method, comprising:

determining a number of exposures to at least one of an advertisement or a product based on feedback from at least one of a microphone or a radio frequency (RF) sensor of a portable device, the microphone to detect

audio from first media associated with the at least one of the advertisement or the product, the RF sensor to detect an RF signal from an RF broadcast device adjacent second media associated with the at least one of the advertisement or the product, ones of the exposures corresponding to respective ones of the first and second media;

retrieving a survey question based on the number of exposures satisfying a rule, the rule to control selection of the survey question;

identifying, by executing instructions with a processor, a recall time when the survey question is to be presented, the recall time corresponding to a duration after satisfaction of the rule; and

offer, at the recall time, the survey question related to the at least one of the advertisement or the product via the portable device.

16. The method of claim **15**, wherein the second media is distinct from and located apart from the first media.

17. The method of claim **15**, wherein the recall time is to be after conclusion of exposure to the first media and the second media.

18. The method of claim **15**, wherein the rule is a first rule, the method further including:

tracking human activity;

generating a predicted schedule based on the human activity; and

identifying the recall time to present the survey question by evaluating the predicted schedule against a second rule.

19. The method of claim **15**, wherein the portable device is a first portable device, the method further including causing a response to the survey question to be provided to a second portable device.

20. The method of claim **15**, wherein the number of exposures is a first number of exposures, the at least one of the advertisement or the product is at least one of a first advertisement or a first product, the rule to include the first number of exposures to the at least one of the first advertisement or the first product satisfying a first threshold number of times and a second number of exposures to at least one of a second advertisement or a second product satisfying a second threshold number of times, the second advertisement being different than the first advertisement, and the second product being different than the first product.

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